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USPS to Deliver Nine-Digit Zip This Summer

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Zip-Plus-Four, the nine-digit Zip Code plan from the U.S. Postal Service (USPS), should be in the mail soon despite congressional efforts to send it to the dead letter office.

Postal Service computer tapes containing the new Zip Code data base should be completed this month and soon be available to businesses wanting to convert to the longer codes.

However, the plan faces continued White House and congressional efforts to slow the program until more cost-to-mailer data is produced.

The Postal Service expects to complete accuracy audits of the tapes sometime this month, a postal spokesman said last week. He added the program is on track despite a May 22 request from the Office of Management and Budget (OMB) that more information be supplied before the plan is finalized.

The Zip-Plus-Four program is an attempt to increase postal automation

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Satellite Plan Seen Menace To BSC Sites

By Brad Schultz

CW Staff

GREAT NECK, N.Y. — AT&T's plan to shunt long-haul traffic onto satellite links may overwhelm IBM's Binary Synchronous Communications (BSC) protocol at many DP sites, a Network Analysis Corp. spokesman warned here last week.

Developed by IBM long before satellite data links arose, BSC is one of the most widely implemented data communications protocols. Unlike the High-Level Data Link Control (HDLC) protocol and its subset, IBM's Synchronous Data Link Control (SDLC), BSC cannot handle time delays AT&T has said may strike half-duplex modem users among Wide-Area Telecommunications Service (WATS) and Message Telecommunications Service (MTS) customers.

Kenneth Ellengold of Network Analysis' technical staff said one-way time delays in WATS or MTS transmissions could reduce the effective speed of 9,600 bit/sec "start and

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IBM May Hike Prices 5% to 10% This Month

By Tom Henkel

CW Staff

IBM is expected to raise most prices 5% to 10% late this month or early in July. If announced, the increase will be IBM's fourth price hike in the past two years.

While IBM declined comment, industry analysts said the company will be forced to make another increase to cope with inflation, a prime interest rate of 20% and soaring personnel costs. Increases by IBM generally set off a rash of similar increases throughout the industry, the analysts noted.

Traditionally, IBM has held the line on new and large system purchase prices, products with technical problems or those facing fierce competition from other vendors. Rental, lease and maintenance prices have been the standard target of IBM increases, and analysts said IBM will probably stick with that tradition if another increase is announced.

Semiannual Event

Since IBM increases have become a semiannual event, what is increased is often more significant than the actual increase. Analysts believe one system to watch is the 3081, announced last November as IBM's top-of-the-line processor and the gateway to IBM's much-talked-about H series of mainframes. A June increase for that machine would mark the shortest run of an announced pricing structure.

The 4300 series, which analysts thought was underpriced from the start, currently holds the record for early price increases at 11 months after announcement. An increase now on the 3081 would come eight

months after announcement, observed William Easterbrook, an analyst with Kidder, Peabody & Co.

Another key is the 8100 line. Re-

(Continued on Page 7)

It's Becoming A Pattern

Except for price cuts accompanying new product announcements and a November 1979 repositioning of General Systems Division prices, IBM has set a pattern of increasing its prices every six months. Here is a list of IBM's pricing changes since late 1979:

- **October 1979:** IBM announced the 3033N processor and cut purchase prices on the 370 line, the 3031 and 3032 by as much as 33%.

- **November 1979:** The General Systems Division announced price cuts of up to 33% on memory enhancements for the Series/1 (4955), System/3 models 8, 12 and 15, System/32 and System/34. It also announced purchase price cuts of up to 15% on the System/3 models 12 and 15, System/32 and lower end models of System/34.

- **December 1979:** In the first of what has become a regular semi-annual price increase, IBM announced across-the-board price increases of 5% to 20%. The heaviest increases came in maintenance charges and program products, which were increased 10% to 15%. IBM raised purchase prices an average of 5% and rent/lease prices by 7%.

- **June 1980:** Making its second regular increase, IBM raised lease, rental and maintenance prices 5% to 10% on most major systems except the System/38 and the 5220 desktop processors. Purchase prices were also increased on the 8100 line and the 3310 and 3370 disk drives.

- **November 1980:** IBM announced the 3081 and 3033S processors and cut the price on the rest of the 30 series by as much as 22%. It also reduced the price of an additional 1M byte of main memory to \$35,000.

- **December 1980:** IBM announced 7% to 8% lease and rental increases and a 15% increase in software and maintenance services. Spared from the increase were the 3081, 3033S, System/38, Series/1, 5220 desktop processors, the 5222 printer, the 3420 disk drive, the 3211 system printer and the 5256 printer.

Data Entry Productivity Dips Despite Salary Hikes

By Ann Dooley

CW Staff

STAMFORD, Conn. — Data entry productivity declined last year even though salaries for data entry personnel increased.

However, the salary increases did not outpace the rate of inflation, a recent survey by the Data Entry Management Association (Dema) found.

In the rush to maximize productivity, the labor-intensive data entry department is coming under the gun — and with good reason, according to Dema, whose survey showed productivity down 1% in 1980. Although the 1% decline is not staggering, the resulting costs begin to escalate when taking into consideration the reported 26.4% share of the average DP budget that data entry holds.

The productivity results are based on survey data submitted by 175 companies in the U.S. and Canada over the last few months. The companies, all Dema members, employ an average 28 operators each.

Average Salary \$10,862

Dema's second annual "Statistical-Compensation Survey" found that while data entry salaries increased by 12% in 1980, inflation ate up the increase, leaving personnel further behind than they were the year be-

fore in terms of purchasing power.

A data entry operator earned an average \$10,862 in 1980, according to Dema. Top operators were paid \$12,844, first-level supervisors earned \$16,448 and data entry managers earned \$23,246.

Eleven percent of the responding

(Continued on Page 2)

Users Rate HP 2640 and LA 120 Top CRT Terminal, Teleprinter

By Brad Schultz

CW Staff

CHERRY HILL, N.J. — Hewlett-Packard Co.'s 2640 ranked highest among CRT terminals and Digital Equipment Corp.'s LA 120 was the top teleprinter in a recent survey of users by Data Decisions, Inc. here.

On a subjective scale of 1 to 10 points, the HP 2640 averaged 8.6 in the poll. The average for all CRT terminals was 7.0.

According to Data Decisions, 9 to 10 points indicated "superior"; 6 to 8 points marked "very good"; 3 to 5 points stood for "acceptable"; and 1 to 2 points meant "inadequate."

Other highly ranked CRT terminals were IBM's 5251, which came in at 8.4; DEC's VT 100 and HP's 2645, tied

at 8.1; HP's 2621 and IBM's 3278, tied at 8.0; Memorex Corp.'s 1377, 7.8; Sperry Univac's UTS 400, 7.7; and DEC's VT 52, 7.5.

As for teleprinters, the 8.3 average won by DEC's LA 120 was followed by the vendor's LA 36 at 8.1 and Texas Instruments, Inc.'s 800 at 8.0, as well as Anderson-Jacobson, Inc.'s 800/832 and Teletype Corp.'s 43, which tied at 7.6. The overall average for teleprinters was 6.7 points.

Data Decisions mailed questionnaires to nearly 5,000 sites; less than half responded. Ratings were based on 1,558 CRT terminal responses and 481 teleprinter responses. Many returned questionnaires did not give ratings or identify models.

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To Deregulate Telecommunications House Again Attempts Act Rewrite

By Jake Kirchner
 CW Washington Bureau

WASHINGTON, D.C. — The House of Representatives has begun yet another attempt to rewrite the 1934 Communications Act to deregulate the telecommunications industry.

Appropriately, the House Telecommunications Subcommittee, whose last legislative effort was thwarted at the end of the previous Congress, began at the beginning.

"What has been missing," Subcom-

mittee Chairman Rep. Timothy Wirth (D-Colo.) said of earlier deliberations, "is a careful analysis of the industry itself with an eye toward determining where competition exists or will develop soon and where, therefore, deregulation is appropriate."

In seeking that "broad conceptual reach," the hearings on May 20 included appearances by several panels of consultants and economists, including Alfred Kahn, who described present telecommunications regula-

tion as "economic nonsense."

Walter Hinchman and Larry Darby, former heads of the Federal Communications Commission Common Carrier Bureau, also testified during what Wirth said will be a long series of hearings to supply "the hard economic data" necessary for deregulating the industry.

Wirth said he hopes the hearings will lead to a subcommittee report this summer that will lay the groundwork for legislative activity later this year.

Data Entry Productivity Down in '80

(Continued from Page 1)

companies employed unionized workers. Salaries at these companies were as much as 9% to 18% higher than among nonunionized shops, according to survey results.

Installations may be moving away from a second and third shift; staff sizes for both these areas decreased by 5% and 7% respectively, as compared with 1979 figures.

On the first shift, operators were found to work an average of 38.95 hours a week, down slightly from 1979, when they worked 39.04 hours. Operators were also found to be taking slightly more work-break time — up to 2.19 hours daily, compared with the average 2.12 hours in 1979 on all shifts.

The actual productive time spent "on the system" by data entry operators also decreased, falling from an average of 28.62 hours for all shifts in 1979 to 27.81 hours in 1980. For 1980, this corresponds to a 71.4% net amount of time spent in productive work compared with total time at work, in contrast to 73.3% in 1979, the survey found.

On the other hand, even though

the amount of productive time declined, the number of keystrokes per operator increased slightly last year — from 10,600/hour in 1979 to 10,794/hour in 1980, according to the study.

The estimated percentage of turnover also increased in 1980, up 5% from 1979's 81%, for a total of 86% last year.

Data Entry Decline

The survey also found that data entry declined in its share of the overall DP budget, going from 28.37% on the average in 1979 to 26.41% in 1980. The reduction in budget share may be attributable to the fact that staff size has decreased slightly in some areas, according to the survey, most frequently because of a shift to added responsibility among users.

In calling for increased productivity within data entry, Norman Bodek, Dema president, said that "productivity doesn't mean a return to a sweatshop environment. It means using the most advanced and innovative technology; it means better methods; it means training employees; and it means involving them in

solving productivity problems.

"The data entry operator is an untapped source of ideas for doing things better," he maintained.

More companies are offering incentives to operators whose productivity exceeds a certain standard, the survey showed. In 1979, only 11% of the companies surveyed offered financial incentives for increased output; last year the figure jumped to 15.5%.

However, benefits such as flextime and reduced workweeks actually decreased in use last year. Bodek maintained that management "has tried different gimmicks to motivate people" and found that the benefits accrued did not offset the added difficulties.

Industries that are the heaviest users of data entry staff were found to be insurance and manufacturing. Utilities, retail and chemical areas use the smallest number of data entry personnel.

The "Statistical-Compensation Survey" is available free as part of the Dema membership fee; it can also be obtained for \$10 from Dema, through P.O. Box 3231, Stamford, Conn. 06905.

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IBM Contender Enters Relational Sweepstakes

By Rita Shoor
CW Staff

WHITE PLAINS, N.Y. — IBM introduced a relational data management system last week as its first official entry in what may be the 1981 relational sweepstakes.

The Structured Query Language/Data System (SQL/DS) supports application areas where interactive query, report writing and end-user data base facilities are desired.

Although SQL/DS was designed specifically to extend the DOS/VSE system environment, IBM's official statement of direction made it very clear that MVS and VM installations can look forward to a similar offering for those operating systems. "It is IBM's direction that any future analogous offerings in the MVS [CICS, IMS, TSO] and VM [CMS] environments will address similar customer data requirements," the vendor said.

SQL/DS supports a relational data model, the vendor emphasized, with data being defined in tabular form and accessed through operations on those tables. The two-dimensional tables, which are the structural part of the relational model, would normally have a fixed number of columns and a variable number of unnumbered rows, according to IBM.

The informational view presented to a user of the logical tables need not conform to the actual physical representation of the stored tables. Views may combine data from several stored tables or other views and may create subset tables by rows and/or columns.

And, since SQL makes it unnecessary to know the physical structure of the data base, the relational model can effectively support a "broad range of user data requirements," IBM claimed.

SQL, the product's high-level access language, supports data definition, access, manipulation and control operations and is available through a CICS/OS/VS transaction or equivalent, a batch utility and application programs, a spokesman explained.

By entering various SQL commands through a terminal, users can report-

s, Technicians
Cobol Changes

Amdax Offers Alternative To Ethernet

By Bob Johnson

CW New York Bureau

NEW YORK — Billed as an Ethernet alternative, a local network for integrating data, voice and video communications at distances up to 50 miles debuted here last week.

Amdax Corp.'s Cablenet broadband coaxial cable system redefines local-area networking and outperforms Xerox Corp.'s Ethernet baseband, according to the company. Simultaneous communications with interbuilding, intrabuilding and intercity capabilities and low (8%) cable bandwidth utilization were cited as the system's major advantages by Amdax.

By using broadband cable and high-speed digital technology, a spokesman explained, Cablenet offers 50 times the capacity of baseband coaxial cable.

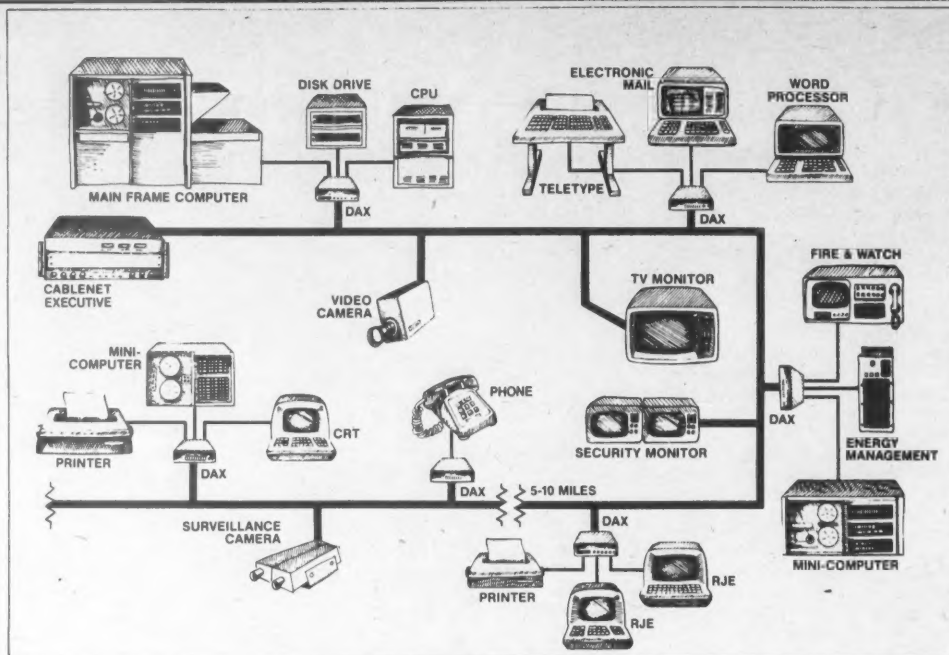
Cablenet supports asynchronous, bisynchronous and IBM Synchronous Data Link Control and High-Level Data Link Control communications protocols in full- or half-duplex modes and all data rates, according to the vendor.

The system can operate at transmission rates of 7M bit/sec or 14M bit/sec, depending on the model selected, the company noted.

Amdax described Cablenet as being "protocol transparent"; it allows the attachment of devices from any vendor and has the capacity to support up to 16,000 terminal devices, Amdax explained.

Two versions of Cablenet are available, Cablenet 7 and Cablenet 14, operating at 7M bit/sec and 14M bit/sec, respectively. The basic components of Cablenet include the Executive "head-end" controller, the Data Exchange (DAX) interface unit, broadband coaxial cable and standard cable TV (CATV) taps and connectors.

The Executive controls the devices



A Possible Cablenet Configuration

attached to the system. It handles network initialization, allocates packets used for interdevice communications and provides the reverse-to-forward translation required for two-way transmission.

Executive models for each Cablenet system are available at a price of \$8,950 for the Model 7 and \$9,750 for the Model 14.

Interface between user terminal devices and Cablenet is handled by the DAX unit. Each DAX has four digital interface ports; three available for connection at data rates up to 19.2K

bit/sec and the fourth configured for diagnostic and control functions. The system has built-in diagnostics, the company noted.

The DAX has an interface that connects the unit to Cablenet via a drop cable. The DAX is also available in Models 7 and 14. The price for DAX 7 is \$3,950 and \$4,500 for DAX 14.

Cablenet uses standard CATV connectors, taps and coaxial cables, which have been used in the television industry for more than 20 years, Amdax said.

Ivan Socher, president of Amdax,

said he wants the system to be used as a utility, as opposed to a product offering, because no single vendor can supply all of the varied equipment a user needs to connect.

Amdax claimed that its system cannot be outgrown, noting that the cable can be routed throughout a building in any configuration. Cablenet can be expanded by adding cables, taps and amplifiers, and additional devices can be plugged in or unplugged as needed.

Amdax is based at 160 Wilber Place, Bohemia, N.Y. 11716.

Local Net Package With 3270 Support Set for Intecom IBX S/40 Supercontroller

By Brad Schultz

CW Staff

DALLAS — Intecom, Inc. this week is announcing a local-networking

package with IBM 3270 protocol support to go with its data/voice switching system.

Called Intenet, the local networking package gives the company's Integrated Business Exchange Series 40 (IBX S/40) packet-switching capabilities and allows both format and protocol conversion. Intecom is an affiliate of Exxon Corp.; its IBX S/40, a 4,000-port system that runs data and voice simultaneously at 110- and 56K bit/sec, was announced about a year ago.

The package includes the 3270 Intenet Packet Controller (IPC) for bisynchronous communication with a host processor at up to 9.6K bit/sec. Without requiring host software changes, the 3270 IPC appears to the host as an IBM 3271-2 control unit, the firm said.

Controller Capabilities

Each 3270 IPC the user implements in Intenet allows as many as 16 Ascii terminals to emulate IBM 3277 devices connected to an IBM or equivalent host.

In league with the IBX S/40's data-switching capabilities, user CRT terminals may be placed throughout a building while still rendering many functions, a spokesman stated.

In forthcoming IBX S/40 enhance-

ments, Intecom plans to support such local-network architectures as Ethernet — from Digital Equipment Corp., Intel Corp. and Xerox Corp. — and Z-Net from Exxon's own Zilog, Inc. subsidiary.

The IBX S/40 eliminates the need for modems by tying workstations together via all-digital lines, according to the firm.

Intenet reinforces "the natural position of the IBX as a shared-resource device, allowing communications between dissimilar terminals using the same system which is simultaneously providing voice service," the spokesman asserted.

Efficiency Factor

"Over 80% of data switching occurs intrafacility," he continued, "so the local ability to tie dissimilar products together as multifunctional devices reduces hardware requirements and allows more efficient use of any external network."

Through protocol conversion, Intecom intends to give the IBX S/40 support for those protocols that prove popular among communications users, he told Computerworld. A single Intenet package costs about \$10,000.

Intecom's address is 16509 Addison Road, Dallas, Texas 75240.

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But No Help From IBM Yet CICS' Built-In Security Inadequate, Users Say

By Lois Paul

CW Staff

CHICAGO — IBM's CICS teleprocessing system offers inadequate built-in security, according to 69% of the respondents surveyed at 30% of the U.S. sites using CICS.

The survey's findings revealed that although users have turned to IBM with their security needs and have attempted to implement existing facilities, IBM is not yet offering a single procedure or solution that meets users' security needs in the on-line environment.

Specific-function independent software or homegrown specific-function programs seem to be better meeting the needs of those most concerned with on-line information security, the survey reported.

The survey attempted to determine if CICS, the most widely used teleprocessing monitor, offers adequate security to protect on-line information.

Out of the approximately 10,000 IBM 370, 30 series and 4300 and plug-compatible computing sites in the U.S., approximately 4,000 use CICS. A sample of 1,460 known sites was chosen at random from these for the survey, which was sponsored by On-Line Software International, Inc. of River Edge, N.J., and conducted by Hubbard Research of Chicago.

There were 290 replies to the two-page questionnaire, which represents a statistical sample of 7% of the U.S. CICS population. This group represented approximately 350 CPUs that drive more than 6,800 local terminals and more than 5,500 remote terminals. Of these, 93% are IBM 3270/3780 or compatible.

Widespread Use

According to John Tower, project manager at Hubbard, the study showed an increasingly widespread use of CICS and an accompanying rise in the need for the security of on-line applications. "Yet whatever solutions are implemented, one fact remains clear in the study: User confidence in security provisions built into CICS by IBM is minimal," Tower said.

The survey found that corporate responsibility for data lay in DP departments at all but 9% of the surveyed sites. Some 74% of respondents said they have an existing corporate policy; of these, 62% reported security was handled on a corporationwide basis and 38% said it was handled by user departments.

Half of the respondents use data base management systems (DBMS), including IBM's DL/I and IMS; Cincom Systems, Inc.'s Total; Intel Corp.'s System 2000; Software AG's Adabas; Cullinane Corp.'s IDMS; Infodata Systems, Inc.'s Inquire; and Computer Corp. of America's Model 204.

Of these, 94% of the users polled indicated a strong need to provide security for DBMS files. In many cases, the users rely on security provisions built into the DBMS itself to protect these files.

The overwhelming majority of respondents (95%) limit access to spe-

cific applications. Access to terminals is limited by 76%. Security violations are tracked by 52% of respondents, yet only 40% rely strictly on CICS for their security needs.

Of those installations that have taken specific action to protect on-line information, the majority have turned to IBM. The rest have developed their own or have purchased independent on-line security software, according to the survey.

Among the varied security measures reported were specific security-oriented software, which 37% of the respondents had installed. Of this number, 58% are using an IBM-supplied system such as Resource Access

Control Facility. A nearly equal number have home-grown password protection or other protection programs built into their systems.

Independent Packages

A small number of sites have purchased an independent software package for security purposes. The survey found most respondents unaware of the availability of these packages.

Those who have chosen a security software package employ definite security functions such as terminal access limits, application access limits and tracking of security violations.

IBM system respondents reportedly

showed no clear pattern of use of security functions, which led the surveyors to surmise that if there are any security measures built into the IBM systems, they are not in full use.

Of the respondent sites, 54% are running under DOS/VS or DOS/VSE. The majority of the respondents (53%) have fewer than 10 CICS applications; 17% reported 10 to 20 applications; and 10% have more than 20 applications.

A total of 107 applications at the various sites included gas transmission, church profiles, nurse scheduling and demand deposit accounting. More than 50% of the respondents reported running three shifts.

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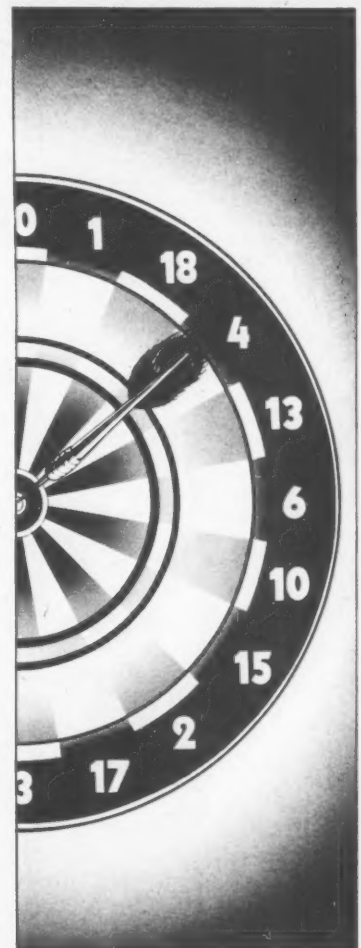
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To Benefit SNA Users

Consultant Predicts New 8100, 3705, NCP Soon

By Jeffery Beeler

CW West Coast Bureau

CULVER CITY, Calif. — IBM is expected during the next few months to announce a successor to its Model 8100 processor, replace its aging Model 3705 communications controller and introduce an enhanced version of its Network Control Program (NCP).

All the anticipated product moves will be aimed at providing users of the company's Systems Network Architecture (SNA) with increased communications capabilities, according to Saroj Kar, who heads a Sunnyvale, Calif.-based consulting firm known as TCT International, Inc.

Within the next few months, IBM will also upgrade SNA itself and replace Tcam and Vtam with a common data communications access method, Kar said during a recent TCT-sponsored seminar dealing with SNA and its probable impacts.

IBM's upcoming successor to the 8100 will operate two to four times faster than the existing machine, which is notorious for its low processing speed, Kar said during the last day of the recent seminar. Likely to be introduced early next year, the 8100 upgrade will be software-compatible with the current processor, especially with its SNA-support programs.

Interim Product

IBM views the 8100 merely as an "interim" product, and the company's main intent in introducing the processor was to evaluate the performance of the firm's distributed processing hardware and software in the SNA environment, Kar said. Now that the 8100's initial testing phase is nearly complete, IBM is in a position to unleash a more powerful version of the distributed processing machine.

The industry giant also plans to an-

User Ignorance of SNA Is IBM Bliss, Kar Contends

By Bob Johnson

CW New York Bureau

CULVER CITY, Calif. — IBM wants to encourage its users to take full advantage of its Systems Network Architecture (SNA), but at the same time, the firm reportedly would like to keep customers as ignorant as possible about SNA's internal workings.

The less users know about how SNA operates, the less likely they will be to examine IBM's performance claims critically or ally their networks with other vendors' peripherals, according to TCT International, Inc. chief Saroj Kar.

IBM has a huge stake in trying to discourage customers from using non-IBM gear in SNA environments. The industry giant stands to lose a large chunk of its peripherals business to independent suppliers, just as it has already seen part of its mainframe sales siphoned off by manufacturers of plug-compatible processors.

The reason for IBM's potential

vulnerability to independent peripherals vendors is simple and has a unmistakable ring of familiarity to it. Just as plug-compatible mainframes are able to use 370-series software and provide more processing power for a lower cost than their IBM counterparts, so certain independent peripherals can operate in an SNA environment and boast a significant price/performance edge over the industry giant's corresponding products, Kar said during a recent TCT-sponsored seminar.

But although IBM may regard independent peripherals as a potential threat, the units may prove a tremendous boon to the company's users by allowing them to boost their networking performance and at the same time cut their hardware costs. "So if users want to use SNA effectively and optimize their networking functions, it's essential that they gain at least a basic understanding of the architecture's internal workings," Kar advised.

nounce soon an enhanced communications controller that will eventually make the firm's well-entrenched 3705 system obsolete. Kar expects the announcement of the 3705 replacement to come "definitely within the next six months," although IBM will probably soft-pedal the product for a while so as not to disrupt its existing 3705 customer base.

Even though it will be compatible with 3705 code, the future IBM communications controller will sport a different internal architecture that

will allow it to operate up to 2.5 times faster than its predecessor and hold twice as much main memory. The 3705 replacement will also provide X.25 support as a standard feature and will be able to communicate with the company's office products line and operate in Satellite Business Systems, Inc. networks, Kar said.

The availability of X.25 support confirmed Kar's suspicion that the communications protocol will merely supplement SNA rather than replace it.

Kar's predictions of IBM's upcoming announcements were based on his conversations with many of the industry giant's major users and on his own analysis of the firm's current product weaknesses, he said.

On the NCP front, IBM is expected shortly to add enhancements that will improve the program's backup facilities and increase the sophistication of its networking capabilities. Other expected enhancements will permit NCP, which operates with the 3705, to work more closely than before with multiple host processors.

Such enhancements will enable the program to continue supporting most network functions even when one of its host processors breaks down — a capability that IBM's current version of NCP largely lacks, Kar explained.

Imminent Developments

In other imminent SNA developments, IBM is expected to introduce soon several additional software tools that will serve basically the same purpose as its Network Communications Control Facilities and Network Problem Determination Aid. Both tools reportedly improve IBM's networking efficiency.

The firm will also add functions that will improve a user's ability to control, manage and service SNA networks. In addition, IBM will merge its two major access methods, Vtam and Tcam, by sometime next year at the latest, Kar predicted.

The expected merger will result in a single access method that will combine Tcam's and Vtam's best features. At present, the prime difference between the two access methods is that Tcam provides a queuing option, while Vtam does not.

Thus, the main impact of combining Vtam and Tcam would be to give the former access method a queuing option, which effectively hastens message transfers, especially in complex, multinode networks.

GTE Telenet Files For Rate Increase

WASHINGTON, D.C. — GTE Telenet Communications Corp. raised its average connection charges from \$4.40/hour to \$5.50/hour in a tariff filed at the Federal Communications Commission late last month. The tariff is scheduled to become effective this week.

The new rates reflect a 35% increase in AT&T's private-line rates and a 50% hike in Wide-Area Telecommunications charges, GTE Telenet said, explaining that "our charges from AT&T constitute the largest single factor in the cost of network operations." The June 1 tariff also reflects a 20% inflation-induced increase in the company's in the company's payroll and related costs.

Forty-one additional Telenet central offices are listed in the new tariff. "In the past year, network capacity and the number of cities offering local dial access have nearly doubled," GTE Telenet reported. And this year "expansion and reconfiguration will again double service capacity."



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IBM 5% to 10% Price Hike Could Hit Users This Month

(Continued from Page 1)

portedly not faring well as the Data Processing Division's small applications processor and distributed processing node, the line may be spared an increase. Last June, IBM raised rent, lease and purchase prices on the 8100; only rent and lease prices were raised in December [CW, Jan 12]. Analysts are split on how IBM will deal with the 8100 if a June increase is announced.

The General Systems Division's System/38 is apparently doing well enough to handle some price increases. Easterbrook and Gartner Group analyst Dave Stein agreed that System/38 will face some pricing action. Whether that action will come in the form of rent and lease increases only or in rent, lease and purchase increases remains to be seen.

IBM has exempted the System/38 from price increases in the past probably a result of market uncertainty caused by operating system problems that forced IBM to delay first System/38 shipments about a year. IBM delivered the first end-user System/38 last July, and initial user reports have been favorable.

The Office Products Division's Displaywriter, a word processing system, is doing well, but IBM may spare it from price increases to keep that system competitive with similar products on the market. Easterbrook said Xerox is readying a similar product for early June announcement, and that announcement may decide what pricing action will be taken on Displaywriter.

Desktop Systems

The General Systems Division's line of desktop systems — i.e., the 5520 and the 5280 — may also be spared price increases in light of an expected announcement of an IBM personal computer. IBM President John Opel recently stated IBM is looking at the personal computing market quite seriously.

The 3033 line, with the possible exception of the 3033S, which was announced last November, will probably be hit with the standard rent and lease increases. IBM has been trying to convince 3033 users to buy their systems by making purchase plans more attractive than leasing. The move, analysts said, is to sell off as many 3033s as possible before that line becomes noncompetitive, falling to additional releases of the H series late this year and early in 1982.

The 4300 line also faces rent and lease increases. Yankee Group analyst Gerard Hallaren thought IBM may increase purchase prices on the upper end of the 4300 line, the 4341-1 and 4341-2. Easterbrook agreed a 4341 increase is possible, but he said IBM probably will not increase purchase prices on the smaller 4331-1 and 4331-2 because those processors have not been quite as successful as the 4341.

For the first time, Easterbrook said, IBM may announce two increases, one for the domestic market and a more significant increase for international users.

The declining value of foreign currencies is having a dramatic effect on

IBM's as well as other computer vendors' earnings. For every 1% decline in a foreign currency as compared with the dollar, IBM loses 3% to 4% in earnings.

Considering first quarter 1981 currency values compared with similar values in the first quarter of 1980, IBM stands to lose 30% to 50% in earnings, Easterbrook said. The possibility exists that IBM could raise domestic prices the traditional 5% to 7% and hike international rates about 10%, he added.

IBM could also have domestic users make up for the losses by announcing a slightly higher increase for the worldwide market, he said.

Computer Science Graduates Starting at \$20,000

WASHINGTON, D.C. — Fresh out of the college classroom, this year's computer science graduates will command average starting salaries of \$20,000 a year, according to a survey by the College Placement Council.

Only engineers — particularly petroleum specialists — will earn more. They are being offered average salaries of \$26,000 a year, the council reported.

The benefits of a technical degree, even at the undergraduate level, are increasingly apparent. While computer science salaries climbed to \$20,000 this year from \$18,700 last year, salaries of liberal

arts graduates rose only 2%, to \$13,000.

Statistics for graduates with advanced degrees in computer science were unavailable because the sample size was too small in this preliminary survey.

These findings and others were obtained from a survey of job offers at more than 180 college placement offices and will be available in the final survey published in July.

More information is available from the College Placement Council, 62 Highland Ave., Uplands Business Park, Bethlehem, Pa. 18017.

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AT&T Videotex Scheme Could Blitz Prestel

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — AT&T's recent announcement of a new videotex display coding scheme could have the same impact on the Prestel system that the Nazi blitz had on Britain in 1940. It is to be hoped that Prestel Director Richard Hooper and his associates will respond as admirably to the second Battle of Britain as their forebears did to the first. The initial indications, however, are not very reassuring.

U.S. videotex and teletext users and information providers have a big stake in the latest battle. It will be at least a year, and more probably two years, until AT&T begins marketing its own line of terminals. In the meantime, France, Canada and Britain will be the only ones offering equipment.

Right after Bell announced its new Presentation Level Protocol (PLP) at the Videotex '81 conference in Toronto last month [CW, May 25], the British, French and Canadians issued press releases saying they would shortly be compatible with it. AT&T was more circumspect.

"We believe that the Department of Communications in Canada will start immediately after this announcement to enhance the coding scheme in their Telidon standard," said Sam Berkman, Bell's chief of information management planning and development — the chief interpreter and promoter of the new specification.

Later, the Canadians officially announced they would introduce these enhancements by the first quarter of 1982.

Nothing was said in Berkman's prepared statement about the other two systems, but at a press conference he explained that the Columbia Broadcasting System (CBS) has developed a protocol embodying the Antiope

transmission scheme and the phone company's alphamosaic display code.

The French, he indicated, would adopt this proposal for the teletext decoders they export to North America and probably for the videotex units as well. Later, Antiope officials confirmed all this.

Berkman indicated at the press conference and stated in a later interview with *Computerworld* that Prestel is "more incompatible" with AT&T's new protocol than either the French or Canadian systems.

Analysis

One major problem, he said, is that Prestel terminals lack bit-plane memories and therefore cannot process the "alphageometric" graphics display codes included in AT&T's new protocol. This problem will exist at least until 1983, he added.

The phone company specification states on Page 1 that it also includes "alphamosaic codes that are compatible with those used by Prestel."

According to Prestel Director Hooper, this statement is a conclusive refutation of the canards circulated by Prestel's competitors saying that the Bell specification is compatible only with Antiope and Telidon.

However, to be truly compatible requires more than a common graphics character set, industry observers have pointed out. There must be common codes for attributes (such as color, flashing and underlining), a common set of commands and a common format for these elements.

While there are similar differences between PLP and Antiope at the moment, they should be eliminated when France conforms to the new CBS protocol. The British, by com-

Fax Machine Receives, Prints CPU, WP, Telex, TWX Output

By Bob Johnson

CW New York Bureau

NEW YORK — A dual-mode facsimile transceiver that can receive and print data from computers, word processors, Telex and TWX was introduced by Panafax Corp. here last week.

The MV-3000 Transverter is a microprocessor-based desktop machine utilizing bit-slice digital technology that allows the distribution of data and images over standard telephone lines.

According to the company, Transverter can receive data from synchronous or asynchronous communicating systems in bi-synchronous, High-Level Data Link Control, Synchronous Data Link Control, Telex and TWX formats. In the asynchronous mode, data is accepted automatically, Panafax said.

Transverter accepts data message rates of up to 9,600 bit/sec and can be programmed to receive in any format a user requires, according to the company.

Resident memory up to 100 pages is also provided, and Panafax stated that a full page can be printed in 15 seconds.

CCITT Standards

In the facsimile mode, the Transverter reportedly meets CCITT

Group III and II standards and automatically adjusts to the mode of a corresponding machine. Transverters contain both modified HUFFMAN and modified READ encoding.

The company said the unit uses thermal printing and produces a resolution of up to 200 by 200 line/in. for standard or fine transmission modes. It also accepts documents as wide as 11 in. and will reduce larger ones down to 8.5 in. for units accepting only that width.

Each Transverter MV-3000 contains a microprocessor, scanner, printer mechanism modem, character generator and digital clock. The purchase price starts at \$6,995. Rental charges start at \$170/mo. Deliveries are scheduled to begin in late October.

Panafax President Denis Drusus told of company plans to add a CRT terminal and keyboard in the near future to permit message composition and transmission as well as data entry and retrieval. Availability for operating in networks such as Systems Network Architecture and X.25 was also mentioned for future consideration.

More information is available from the firm at 185 Froelich Farm Blvd., Woodbury, N.Y. 11797.

parison, not only have failed to work out a similar deal with AT&T, they have mortgaged their next generation of Prestel terminals to a different standard — the Conference of European Postal and Telegraph Authorities (Cepta) agreement ratified by 26 Western, Northern and Central European countries a few days before Bell dropped its bombshell.

As Andrew Stephens, head of Prestel's International Division, admitted

at Videotex '81, there are differences between Cepta's alphamosaic code and AT&T's. He indicated they were minor and called for a British, French, U.S. and Canadian effort to resolve them through joint development of an international standard — one based on AT&T's alphageometric and Cepta's alphamosaic codes.

However, even if Stephens' proposal is implemented, it will be a while before the standard materializes.

Meanwhile, Britain plans to implement the Cepta alphamosaic character set next year. At that point, according to AT&T's Berkman, Prestel data bases will be accessible through PLP/Telidon-based terminals, provided the British install conversion software (transcode) at the data base end of the connection.

Graphics Access

Even then, Prestel terminals still will not be able to access graphics from PLO/Telidon data bases. Thus, the only terminals capable of accessing graphics from all of the existing systems — Prestel, Antiope and Telidon — will be those supporting the new AT&T protocol.

Prestel Director Hooper and his associates did not point out in their comment on the AT&T protocol that a problem exists between it and Prestel only where graphics are involved. Prestel can communicate with any of the other systems if the communication is restricted to alphanumeric characters because all use the Ascii character set.

Hooper and others, in the papers they presented at Videotex '81, argued convincingly that videotex and teletext are primarily text-based services and are likely to remain that way for the next couple of years.

Longer Zip on Track Despite Delay Tactics

(Continued from Page 1)

by adding four digits to every Zip Code to further refine mailing addresses. Planned as a purely voluntary program aimed at large mailers, which would receive a rate discount for using the longer codes, the project would supposedly speed mail sorting and thus cut postal costs.

The plan has long been opposed in both the Senate and the House of Representatives, where bills to ban use of the longer codes are working their way through the legislative process. Lawmakers on both sides of Capitol Hill have repeatedly tried to get more information from the Postal Service to justify its optimistic cost/benefit claims for the program.

Spurred by congressional concerns, OMB in April asked the Postal Service to provide a "regulatory impact analysis" — pursuant to a Feb. 17 presidential order covering issuance of new regulations — before proceeding with the new codes. While disagreeing that the Postal Service is bound by the executive order, USPS did provide an analysis that was scheduled for publication in the *Federal Register* last Tuesday.

In its May 22 response to the impact analysis, James C. Miller, OMB administrator for information and regulatory affairs, told Postmaster General William F. Bolger that "on the basis of the information provided thus far, we cannot determine whether or not your proposal comports with the regulatory principles set out in the executive order."

Data Requested

OMB requested additional information on what the new codes will cost mailers, on other postal automation options and on how the Postal Service arrived at its cost/benefit figures.

Postal Service spokesman Robert Becker said last week the service will hold off publishing the analysis and will supply the requested additional information as soon as possible. In the meantime, he said, the agency has no intention of halting its implementation plans.

"There has been no specific change in our policy at this moment," Becker said, adding there is no way to predict what steps USPS might take if OMB does not approve of the new

information.

In an April 22 letter to Miller, Postmaster General Bolger claimed the Postal Service, as an independent agency, is not bound by the executive order. This presumably would allow Bolger to argue that his agency can proceed with the nine-digit plan whether OMB approves or not.

However, Miller responded that "our general counsel has concluded the Postal Service is indeed covered" by the executive order, indicating OMB would expect the Postal plan be deferred until authorized by the White House.

It is too early to gauge the effect on the Zip-Plus-Four program of this interagency wrangling because the plan is in the very early stages of implementation. The outcome of the dispute is more likely to be decided by whatever action, if any, Congress takes.

A number of bills to assure that use of the new codes remains voluntary have been introduced in both houses of Congress. In addition, a House bill to kill the plan will reach the floor soon. And a similar Senate bill is under way.

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AT&T Shift to Satellites Draws Modem Makers' Fire

By Brad Schultz
CW Staff

The presidents of two major modem manufacturers have voiced sharp criticism of the way AT&T is handling the shift to satellite links that threatens half-duplex modem users.

AT&T may be violating antitrust law by manipulating the half-duplex marketplace because the common carrier knows better than any competitor when and to what extent time delays and echo problems will strike DPs, according to Charles P. Johnson, president of General Datacomm Industries, Inc.

In an interview, Johnson said he had written AT&T Chairman Charles Brown several times to arrange a meeting to discuss the problems due to strike Wide-Area Telecommunications Service (WATS) and Message Telecommunications Service (MTS) customers with Bell 201, 202 or equivalent modems. But Brown did not cooperate, Johnson maintained.

Reached for comment last week, the AT&T chairman denied knowledge of what Bell "Dear Customer" letters said would happen to half-duplex DP users.

License Required

According to Johnson, AT&T stated General Datacomm would have to purchase a license from AT&T's wholly owned modem maker — Western Electric Co. — before the latter would advise General Data-

comm on ways to protect its Bell-compatible products from the time delays and echoes.

General Datacomm and many other vendors sell modems equivalent to the 201 and 202, so the problems threaten their business, Johnson indicated. The matter may have to be considered by the Justice Department, which is prosecuting an antitrust case against AT&T, the General Datacomm president declared.

'Colossal Blunder'

In a separate interview, Codex Corp. President Art Carr maintained that AT&T is committing a "colossal blunder" by pushing WATS and MTS onto satellite links before Western Electric itself has time to prepare for repercussions.

"AT&T would like to willy-nilly switch the world around," Carr remarked, but is so vast and voice communications-oriented that its top executives simply lost control over the shift's impact on the DP community or neglected to consider it.

This impact is one item on the agenda of a meeting the Federal Communications Commission (FCC) has planned for June 25. Interested parties are invited to attend and suggest how the commission may act on the matter.

More information is available from Bill von Alven, FCC, Room A405, 1919 M St., N.W., Washington, D.C. 20554.

Satellite Plan Seen Menace

(Continued from Page 1)

stop" links, which are widespread among DPs, to slower than 7K bit/sec. One-way time delays of up to 350 msec and echoes lasting up to 700 msec could hit those using Bell 201, 202 and equivalent half-duplex modems. AT&T has warned in "Dear Customer" letters, but options may shield many 202- and 208B-type units from the danger [CW, March 23].

For several years, many DP vendors have anticipated problems with satellite data links in product designs, so the danger seems greater for long-haul data communications users with relatively old or unsophisticated equipment.

The problems stem from distances of nearly 50,000 miles that satellite-carried data must travel. The data takes at least 700 msec to go that far [CW, May 18].

Gear Shuts Down

HDLC and SDLC can handle such delays, Ellengold said. But BSC requires sender modems to wait so long for receiver devices to acknowledge correct reception that the additional time consumed by space travel leads sender gear to shut down.

Modems typically quit when acknowledgements do not arrive within a preset time frame, Ellengold explained, because the no-show is taken to mean the link has died for some reason.

A block of 1,000 8-bit characters runs through a 9,600 bit/sec modem in about 833 msec, he pointed out.

Adding the 350-msec time delay mentioned in the Bell "Dear Customer" letters, the block would need about 1.18 sec to pass the modem, which is too long for many links to stay alive.

What can affected users do? First, consult the modem manufacturer. Ellengold advised, to see whether options are available to skirt the problem. Bell itself offers such options, covering the problem of echoes as well as time delays.

Second, a few vendors market satellite delay compensation units (SDCU) that tell white lies to modems. As milliseconds tick by, Ellengold said, the SDCU passes its own acknowledgement signal to the modem before the latter's maximum wait time expires and also assumes the critical job of waiting for acknowledgements from the link's opposite end.

In this way, the SDCU pacifies the waiting modem with false assurances, but keeps apprised of the link's real condition so errors can still be detected, the Network Analysis expert observed.

But beyond these steps toward resolving the problems described by Bell, WATS and MTS users married to the BSC protocol may be forced over to HDLC or SDLC either through protocol converters or substantial replacement of DP hardware, he cautioned.

The Bell "Dear Customer" letters state that Dec. 31 is the absolute deadline for making whatever changes are necessary.

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OS-1

Users Rate HP 2640 Top CRT Terminal;

(Continued from Page 1)

Data Decisions found no major problem areas among CRT terminal users. Only a tenth of them reported service quality problems occurring "often" to "very often." The same proportion said service consistency problems appeared that frequently.

The survey also found just 10% of CRT terminal users claiming their units interfered with applications development that frequently. A mere 3% said log-on or transmit/receive procedures soured "often" to "very often."

Communications lines fouled up that frequently for 9% of the CRT terminal respondents, while communications disruptions caused by host operations were said to occur "often" to "very often" for 6%.

Teletypewriter users told Data Decisions much the same story. The sum of "often" and "very often" responses amounted to 9% of respondents for service quality problems; 9% for service inconsistency; 16% for applications development interference; 4% for log-on or transmit/receive problems; 4% for host operations disrupting communications; and 9% for communications line problems.

The distinction of lowest rated CRT terminal went to unspecified Beehive International, Inc. models. Thirty-seven users of 44 units gave the

Beehives a 5.8 average on the 10-point scale.

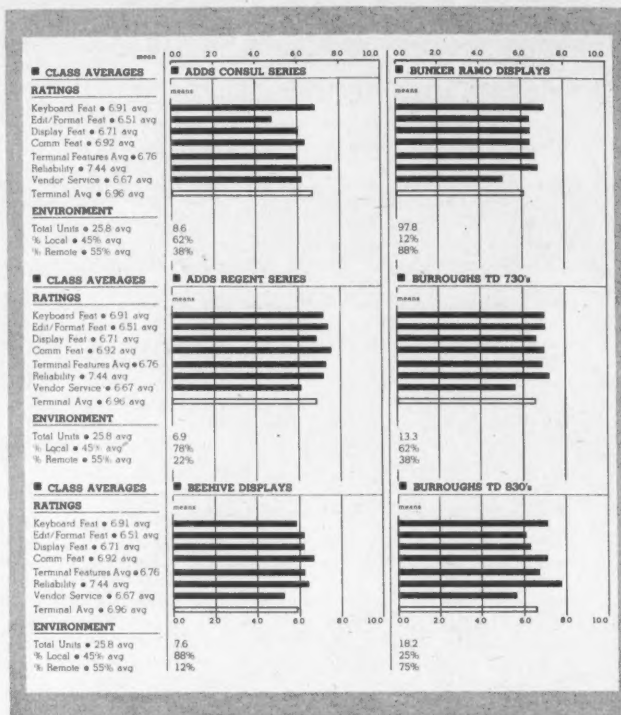
However, Datapoint Corp. 1500s and unspecified TEC, Inc. CRT terminals had just 5.9 averages from 11 and 35 users, respectively. Tied with averages of only 6.0 points were unspecified Bunker Ramo Corp. mod-

The charts here and on Page 11 show how users rated different vendors' CRT terminals in Data Decisions' recent survey. Teleprinter ratings are on Page 12.

els, Hazeltine Corp.'s 1500 and Raytheon Data Systems Co.'s PTS 100 CRT terminals.

The lowest rated teleprinter was IBM's 2741, given a 5.0 average by 13 users of 34 units. Next to worst was the Burroughs Corp. TC 4000 (5.7). General Electric Co.'s Terminet 1200 and the Teletype 35 tied with 5.9 averages, while NCR Corp.'s Model 260 teleprinter averaged 6.0 points in the Data Decisions survey.

Entitled "Interactive Terminal Ratings," the report summarizing results of the survey costs \$25 from Data Decisions at 20 Brace Road, Cherry Hill, N.J. 08034.



Data Decisions, Inc. Charts

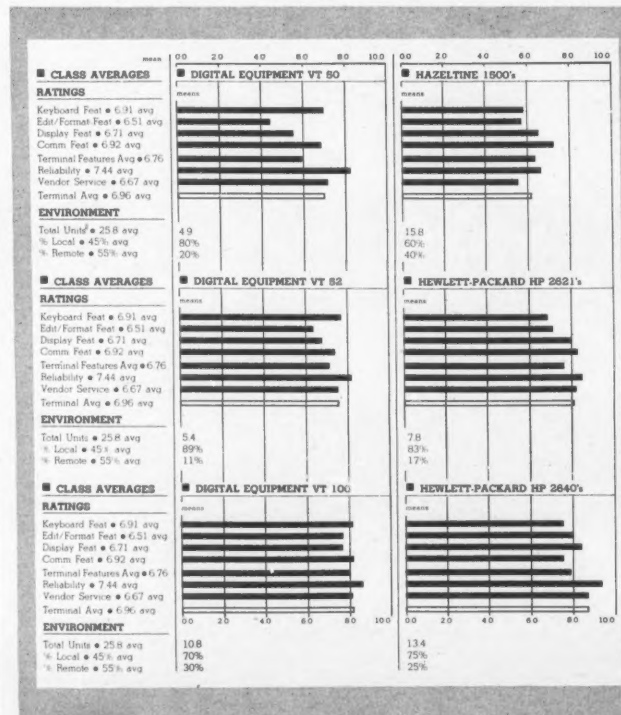
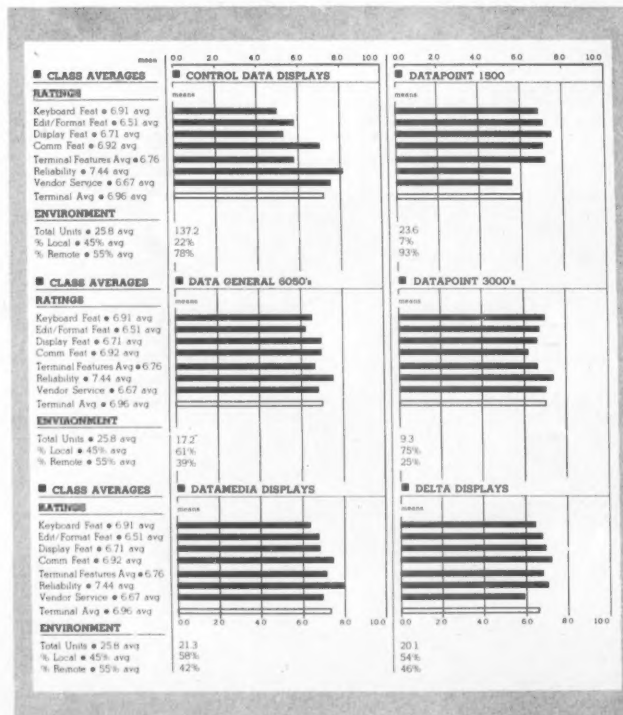
LEGENDA

Class Averages • averages of values for all displays

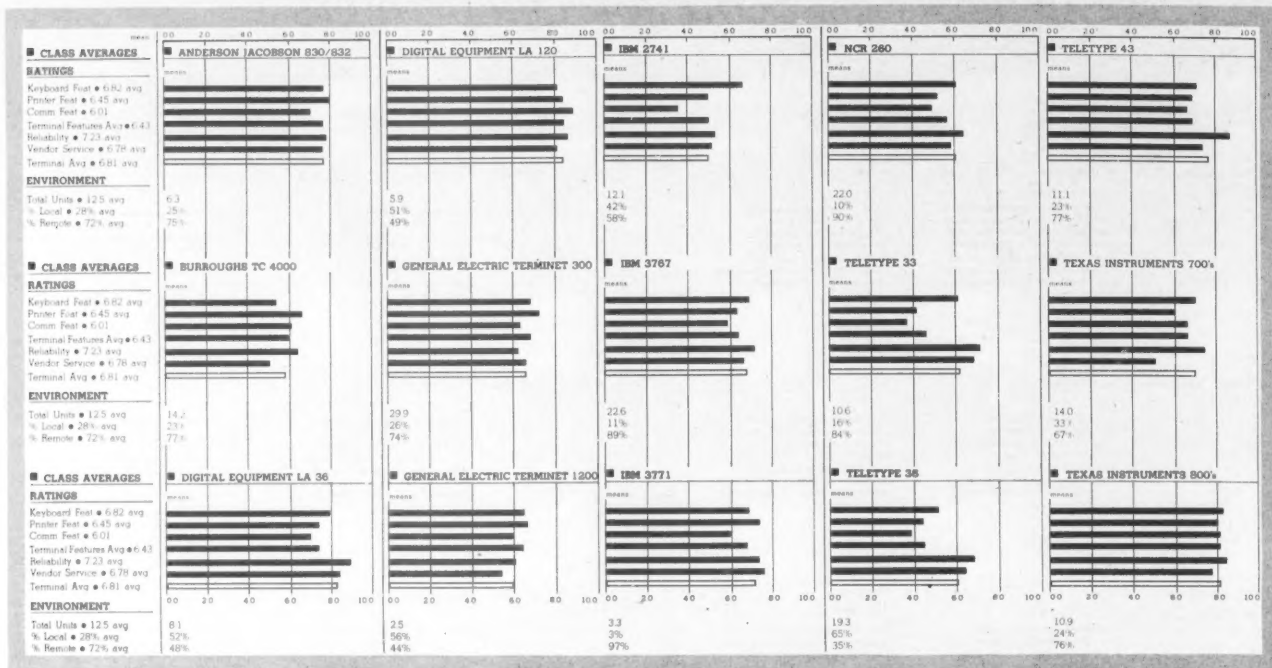
Ratings ● values presented are means of users' ratings on a scale of 10 to 1, with a rating of 10-9 indicating Superior, 8-6 indicating Very Good, 5-3 indicating

Acceptable, and 2-1 indicating Inadequate ● Terminal Features Avg is average of the 4 preceding values ● Terminal Average (open bar) is average of Terminal Features Avg, Reliability, and Vendor Service

Environment • self explanatory



Data Decisions' Ratings of Teleprinters



Data Decisions, Inc. Charts

LEGEND

Class Averages • averages of values for all displays

Ratings • values presented are means of users' ratings on a scale of 10 to 1, with a rating of 10.9 indicating Superior, 8.6 indicating Very Good, 5.3 indicating

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Hearings Open On Bill Forming Info Institute; NTIA Negative

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The House of Representatives opened hearings last week on a bill to establish a federal office to coordinate national information policymaking — and promptly ran into White House opposition to the plan.

Creation of an Institute for Information Policy and Research would worsen, not relieve, the fragmentation of information policy roles that exists among various federal departments and agencies, according to Dale N. Hatfield, acting head of the National Telecommunications and Information Administration (NTIA).

Addressing the House Subcommittee on Science, Research and Technology, Hatfield, whose agency serves as the President's primary advisor on information issues, said that "virtually all of the desirable objectives and shared goals of this proposed legislation can be achieved ... and, indeed, are being pursued within the framework of existing laws and organizations."

Forum Envisioned

The legislation, sponsored by subcommittee member Rep. George R. Brown Jr. (D-Calif.), envisions the proposed information institute as a "forum for the interaction of government, industry and commerce and educational interests in the formulation of national information policy options" [CW, Jan. 12].

Set up within the executive branch, the new organization would also "provide a focus and mechanism for planning and coordinating federal research and development activities related to information science and technology."

In the face of the growing importance of information in society, the U.S. has lagged behind other industrial nations in developing private and public mechanisms to coordinate the introduction of information and telecommunications technologies into factories, offices and schools, Brown contended.

In a statement at last Wednesday's hearing, Brown said that "the U.S. approach to the challenges of the information revolution has been more decentralized and less coordinated with responsibilities fragmented among a number of agencies."

"The many arms and legs of our information research, development and policy formulation process can perform impressive feats, but the creature often appears to be lacking a brain to coordinate this activity," he said.

Brown's bill would transfer to the proposed institutional "brain" several existing organizations, including the NTIA Office of Policy Analysis and Development and, as the President sees fit, any information-related activities currently administered by other agencies.

However, Hatfield argued that in "separating the policy research from the policymaking, the proposal could adversely affect forward progress."

Pentagon Tells Congress Norad System Now OK

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — America's early warning defense system is no longer endangered by the kind of computer-related foul-ups that caused false alerts several times in the last two years, high-ranking Pentagon officials have assured Congress.

Recent technical and managerial improvements for the North American Air Defense Command (Norad) systems in Colorado "are sufficient to correct the problem and prevent its recurrence," Richard D. DeLauer, undersecretary of Defense for Research and Engineering, told a House of Representatives subcommittee recently.

The Pentagon statement followed by one day General Accounting Office (GAO) testimony that there remain significant software and hardware difficulties with the system related to the Defense Department's worldwide DP/telecommunications systems. Although recent Defense Department actions have removed Norad from the critical list, the GAO said, corrective action is still imperative [CW, May 25].

Under Control

The Defense Department sought to assure the subcommittee that the situation is under control. "These corrective efforts were not limited to fixes of specific mal-

functions ... but constituted a comprehensive review of the entire spectrum of the ... system," according to Lt. Gen. Hillman Dickinson, director of the military's command, control and communications systems.

Specifically, Dickinson said, the Norad command has been completely freed from any hardware and software procurement constraints previously in place by its relationship to the Worldwide Military Command and Control Systems.

Norad officials can now design and acquire an early warning system upgrade based solely on their own needs, he said.

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Datacomm Briefs

Firms, Trade Groups Protest Rewrite Terms

By Phil Hirsch

CW Washington Bureau
WASHINGTON, D.C. — S. 898, the Senate Commerce Committee's latest rewrite of the Communications Act of 1934, would "lessen or eliminate competition, stifle innovation and reverse the trend of expanded consumer choice in telecommunications services and customer premise equipment that has evolved during the last decade."

So said seven companies and trade groups, representing more than 800 companies with 1980 revenues of \$7 billion, in a recent letter to Secretary of Commerce Malcolm Baldrige.

Baldrige will reportedly present the Reagan administration's position on the bill at a Senate Commerce Committee hearing this week.

Meanwhile, in a letter to Committee Chairman Robert Packwood (R-Ore.), Satellite Business Systems suggested changing several provisions of S. 898. The proposed revisions deal with interconnection transition to deregulation, tariffs, access charges and telephone company structure.

Court Move Possible On Wats Rate Hike

WASHINGTON, D.C. — Opponents of the Time-of-Day Wide-Area Telecommunications Service (Wats)

tariff authorized last month by the Federal Communications Commission [CW, May 25] were scheduled to take their objections to court last week if the commission refused to defer the tariff's June 1 effective date.

The new rates reportedly will increase communications costs 30% to 85% for some large firms using the service.

A separate 16% increase in Wats rates is scheduled to take effect July 9; private line and dial-up charges will also be raised 16% at that time as part of a "general rate increase" (GRI). Petitions requesting review of the GRI decision are now pending before the court of appeals.

Meanwhile, the Second Circuit

Court of Appeals in New York is considering whether to review a 16.4% increase in private-line rates that became effective May 14.

Justice Opposes Waiver For AT&T's CCS-II

WASHINGTON, D.C. — The Department of Justice was one of several organizations that strongly objected late last month to letting AT&T offer Custom Calling II (CCS-II) as a "basic" rather than an "enhanced" service.

In its Second Computer Inquiry Decision last December, the Federal Communications Commission said specifically that CCS-II is an enhanced service that can be offered by the phone company only through a separate subsidiary. However, the decision establishes a procedure for waiving the requirement for this and other enhanced services.

AT&T requested a waiver for CCS-II in March [CW, March 30]. If granted, it would allow the service to be offered directly by Bell operating companies.

Here are excerpts from the objections:

- Justice Department: "The waiver sought by AT&T is yet another attempt to use its monopoly power over local exchange facilities services ... to obtain a position of market power in competitive services."
- IBM: "If the commission should grant a waiver on the basis of the unexceptional case presented here, all of those who look to the second computer inquiry as inviting unregulated competition in enhanced services will be forced to reassess their ... plans to enter these markets."
- Satellite Business Systems: "If it grants the waiver, the commission will do by indirection what it flatly refused to do directly only a few scant months ago."
- Exxon Enterprises said AT&T's arguments in defense of waiving the separate subsidiary rule for CCS-II "could be marshalled in defense of virtually any request for waiver to allow an enhanced offering to be integrated with the telephone network."

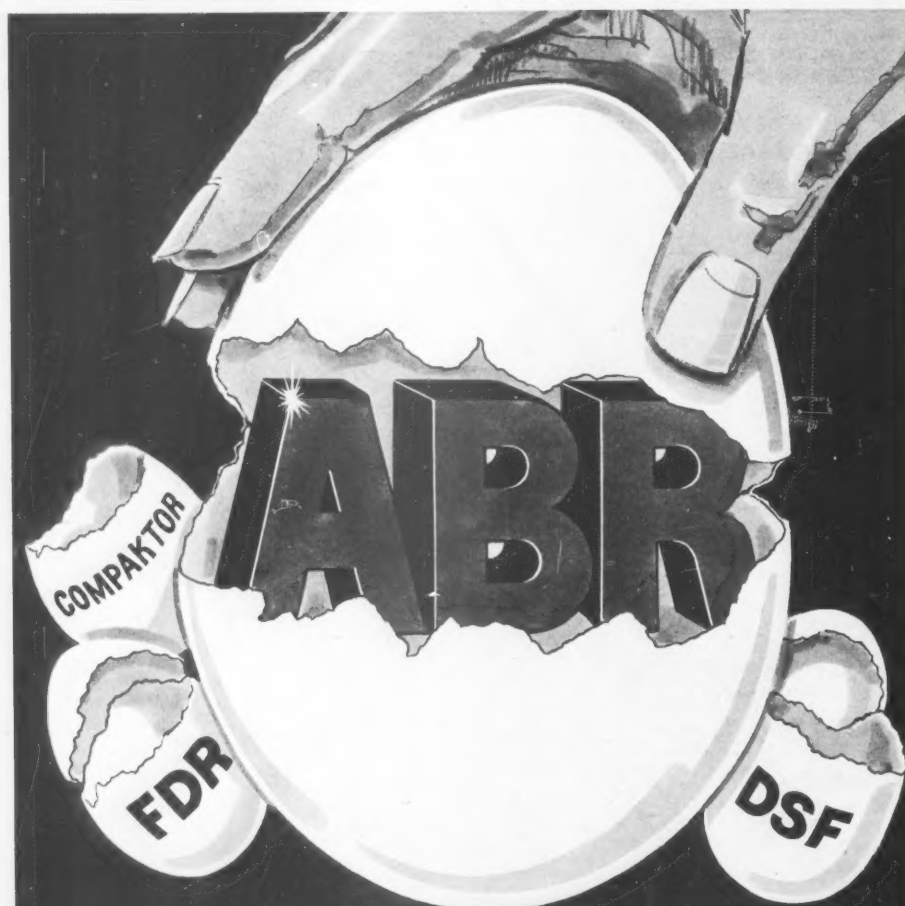
Petitioners Ask FCC To Reconsider DTS

WASHINGTON, D.C. — A number of petitioners have requested reconsideration of the wideband local distribution networks authorized by the Federal Communications Commission (FCC) last January.

The January decision, which set aside frequencies for a microwave-based digital termination service (DTS), was inspired by Xerox Corp.'s 1978 Xerox Telecommunications Network, the all-digital electronic message system that Xerox last month announced it was abandoning.

Local Digital Distribution Co. (LDD), one of those requesting reconsideration of the DTS decision, asked for changes in the power density limits.

The California Public Utilities Commission said state regulators should have more authority over digital termination services.



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Large-Scale CPU Leasing Down State of States' DP: Purchases of Minis Up

By Bill Laberis
CW Staff

LEXINGTON, Ky. — With budget axes cutting deeper than ever, state governments are more readily being drawn to purchasing ever-cheaper and more powerful stand-alone minicomputers, leasing fewer large-scale CPUs.

But the proliferation of distributed systems in state shops can create a chaotic and confounding "Tower of Babel" unless there is a strong sense of control over who gets the minis and what will be done with them.

Thus concluded the National Association for State Information Systems (Nasis) in its just-released 11th annual report on the state of the states' information systems resources.

The findings are based on an analysis of DP information collected from all 50 states, the District of Columbia, Guam and three Canadian provinces.

Of the 136 new systems installed in 1980, 65% of them — 90 in all — were minicomputers, reflecting a trend that Nasis said began in 1978. This trend has crooned an accompanying swan song for the lease of big CPUs, with their rentals being slashed in half in the last five years.

Personnel Problem

For the third consecutive year and to no one's great surprise, Nasis found the recruitment of qualified personnel to be the states' most acute DP problem, with more than half the states reporting the situation to be getting worse.

Faced with the prospect of competing for manpower with a booming private sector, the states are turning more frequently to using outside consultants despite sharply escalating consultant costs. Meanwhile they are stepping up in-house training efforts.

"The sharp increase in the percentage of data entry and operations employees involved in training programs is the most striking finding," the report said.

"It is assumed that this was in fact brought on by increases in installed CPUs... and by installation of state-of-the-art data preparation equipment. Formal in-house training programs continue to be far and away the most popular method of training, with vendor schools being a distant second."

Personnel problems are further fueling a perpetuation of the trend to using more canned software packages, with more than 75% of the reporting states using some packages and 95% using data base management systems.

Internally, "high costs, missed programming schedules and programming backlogs continue to plague the [DP] manager," Nasis said. But the report found that a lack of understanding, commitment and interest on the part of these same managers was ranked just behind personnel recruitment as the states' biggest DP headaches.

"The pattern of management of various factors which make up the information system function of state government shows very little change from year to year," the report said, "although the carrying out of these management responsibilities becomes more and more difficult."

One disturbing feature of the report is the finding that many states are continuing to ignore potential security problems, refusing in some cases to take even the simplest of data file and plant security measures.

Of the states reporting, nearly half did not require the posting of security guards outside classified areas, while one in five did not even require the use of identification badges in the same areas.

Backup Storage

All but 12% of the sites reporting used off-site backup storage for data files. But again, Nasis reaverred the warning it has included in its reports

since 1973 that, "we are courting potential catastrophes of great dimension" in the security area.

Finally, state DP expenditures were found to have grown 12% last year to a total of \$1.6 billion, compared to a national industrywide growth of 15% in 1980. Of this \$1.6 billion, 47% was consumed in personnel expenses — about the same as the national average — with 28% of the budget earmarked for hardware and 1% for software.

The complete Nasis report, which itself has risen 50% in price over the last two years to \$30, is available from the association at P.O. Box 11910, Lexington, Ky. 40578.

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Explosion in Industry Lawsuits Seen by '85

By Bob Johnson

CW New York Bureau

ORLANDO, Fla. — What's the fastest growing segment of the computer industry? Software packages? Peripherals? Plug-compatible processors?

None of the above, according to Dick Brandon of the Brandon Consulting Group, Inc. It's computer litigation.

"There are some 600 cases of computer litigation before the courts today," Brandon said here in his keynote address at the recent 17th annual American Institute of Certified Public Accountants Computer Conference. "By 1985 there will be 5,000, which will only be exceeded by the number of personal injury

cases."

A computer lawsuit usually costs a company \$500,000 and takes seven years to complete. "They are the scourge of the industry," Brandon said. His company alone has 53 clients in litigation.

Placing Blame

The main cause of this increased legal action is the adverse relationship between users and vendors, Brandon said. Users are buying a wide variety of equipment from many vendors, which only allows vendors to "finger point" at their competitors when something goes wrong with a system.

Users are not blameless either, because they "are not aware of the

products they buy," Brandon said. He estimated that of the 7,500 computer vendors in the country, 5000 will not be around in 1985.

Five key problems are aggravating the user-vendor relationship, Brandon said. Most of them are unnecessary, but all of them should be understood by certified public accountants (CPA).

First is a problem of perception. Users expect vendors to build a system to meet all of their requirements. Vendors, on the other hand, offer only standard systems.

For example, one accounting firm bought a "complete" system only to find that it was not as complete as expected. The company also hired a programmer only to find out that he

could not program the new system.

"There was a total difference in perception. It was a matter of user expectations vs. vendor capabilities," Brandon said.

Second is the problem of machine reliability. System reliability is the "God-given right of every user," Brandon said. Users are often victims of vendors that tell them their environment is causing the problem. The blame is often put on air conditioning, dust or humidity.

System performance is the third problem and goes hand in hand with system reliability. Systems degrade, Brandon said, because vendors do not properly configure them.

The structure of the computer industry itself is the fourth problem. The market fosters the development of small, undercapitalized firms where "any three unemployed programmers is a software house, and any one is a consulting firm," Brandon said.

Question of Ethics

The fifth problem is the lack of business ethics in the computer industry, Brandon said. He recounted a conversation he had with an executive of a computer firm over the sale of a system that was not the right one for the job to be done. The company executive told Brandon that he would rather sell the wrong machine than make no sale at all.

These factors are putting the accounting profession in a dangerous position, Brandon warned the 500 accountants, auditors and planners at the conference. Accountants are presumed to be experts and also to have a "professional duty of care" — as vendors do. CPAs are in a position to use software or systems, and they must be careful not to undermine their client's best interest, he said.

"Read every contract," Brandon advised. "There are dangerous words in contracts that may waive warranties, and users can lose their rights."

He added that every time a vendor loses a case, it modifies the contract to protect itself later. "The only way for users to get around this is to sue for fraud by inducement."

"A lot of people signing DP contracts are potentially liable by virtue of lack of intelligence," Brandon continued. "Users suffer from hardware infatuation; they are concerned with the fastest and best and are not concerned with the uses of the machines or the problems to be solved."

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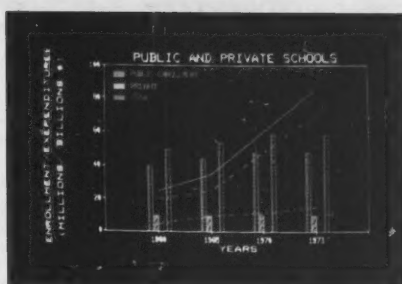
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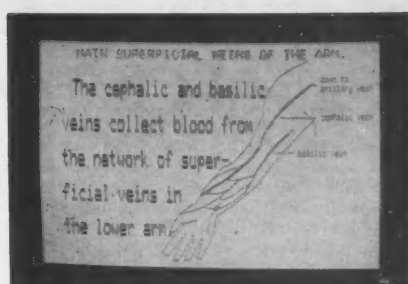
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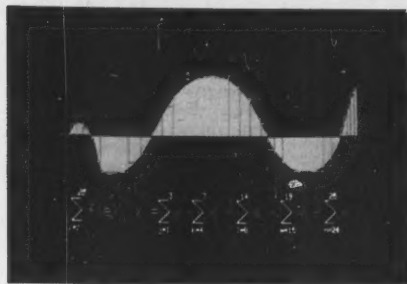
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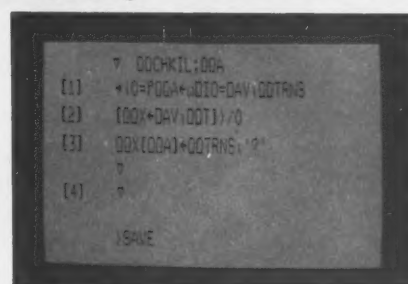
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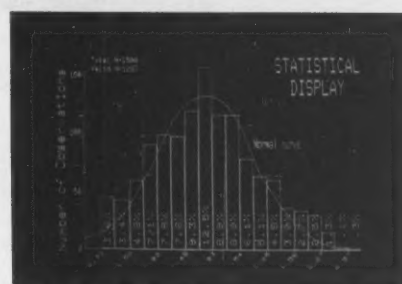


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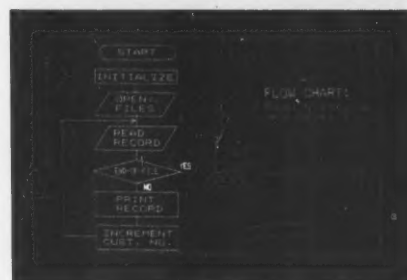
Sample Characteristics

COL (IND) TEST CASES	Low Bound	No. Cases	17 Cases
1	-1.75	91	-
2	-1.24	154	12
3	-0.99	180	15.4
4	-0.40	201	23.0
5	0.83	238	27.8
6	0.50	144	11.0
7	1.3	100	7.5
8	1.81	59	6.1

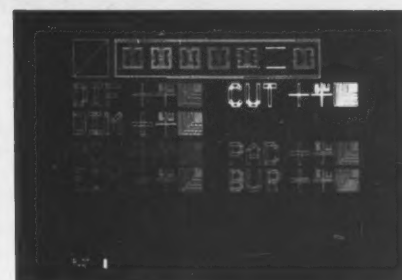
Statistical Table



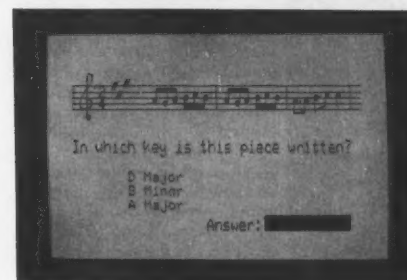
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Student Charged With Felony in DP Scam

By Jeffry Beeler

CW West Coast Bureau

SAN JOSE, Calif. — A San Jose State University student has been arrested and charged with a felony for allegedly using unauthorized communications ports to gain access to campus systems elsewhere in the state and possibly even in other countries.

The suspect, Han Shan S. Scott Anderson, reportedly

found a hole in his school's security safeguards and was able to communicate with other universities' systems by illegally routing his phone calls through intermediate campus computing centers.

Anderson's alleged misdeeds are said to have deprived the intermediate processing sites of valuable computer time that by all rights belonged to other stu-

dents.

The stolen time was then reportedly used to play games like "Dungeons and Dragons" and "Star Trek" with students at other California universities and perhaps in countries as far away as Sweden and Taiwan.

Illicit Phone Bills

A subsequent audit of San Jose State's systems logs has uncovered some 45,000 min-

utes of unauthorized computer use and more than \$7,000 worth of illicit long-distance phone bills, according to Sgt. Bill Lane of the campus police force. How much of the suspected misuse can be directly attributed to Anderson has yet to be determined.

The investigation has also unearthed evidence that Anderson's alleged abuses are routinely duplicated at cam-

pus computing centers throughout the U.S. "Shortly after we arrested the suspect, we confiscated a three-foot-high stack of printouts containing suspicious messages from students around the country," Lane recalled.

To local police, the printouts suggest the existence of a nationwide network of college students who have apparently made a hobby of circumventing campus security precautions and pilfering computer time nearly at will. If the suspected network indeed exists, it could deal higher education a "tremendous" blow by intentionally or unintentionally robbing serious students of scarce computer resources that otherwise might be used for legitimate, worthwhile projects, Lane said.

In addition to his alleged use of unauthorized communications ports, Anderson is suspected of having erased programs belonging to other students both here and elsewhere in the California university system, according to Jan Thompson of the San Jose State Public Affairs Department.

Anderson, an 18-year-old freshman, now faces charges of felonious computer fraud and telephone misuse and was scheduled to appear in local court for arraignment on May 21, Thompson said.

San Jose State

The suspect's alleged computer abuses apparently began in September 1980 — perhaps even earlier — and took place in the San Jose State instructional computing laboratory, which is available free of charge to any student with a valid account number and a demonstrated need for computer time. The lab is open 24 hours daily and is equipped with terminals and acoustic couplers that provide users with telephone access to assorted port selectors throughout the state.

Although it depends primarily on a "restricted phone system" that prevents users from placing long-distance calls, the lab does provide a limited number of communications ports that allow students to interact with far-off mainframes elsewhere in the state's university system. As long as users confine themselves to the assigned ports, their communications with other campus computing centers are considered perfectly legitimate.

Anderson's alleged misuse of San Jose State's facilities was apparently limited to the school's instructional computer lab and spared the main campus data base, which holds sensitive files.

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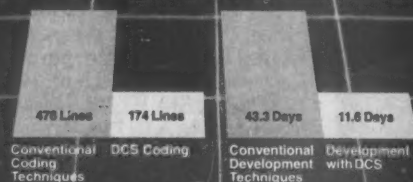
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Foul-Up Leaves Nuns Befuddled, Writer Corrected

By Bill Laberis

CW Staff

NEW ORLEANS — Mild-mannered Sister Joan Mary, principal of the St. Alphonsus School here, was a little befuddled and not terribly amused with a Western Union Mailgram she received last month.

It was from Gene W. Milner, chairman of Lanier Business Products, Inc. in Atlanta, and it read:

"I am counting on your tails being out in the field selling for the rest of this month and all of May. I don't want to hear nothing but that you are producing. Don't hire — don't do nothing else. Don't fiddle with papers, don't talk on the phone to your grandmother. Get the hell busy for the rest of the fiscal year."

Because of a computer-assisted error, Sister Joan Mary and about 500 other Catholic grade school principals received the front office edict originally intended for Lanier's 130 sales managers.

Western Union, obviously embarrassed over the situation, has refused to give any details explaining just what happened, saying only that it was a computer foul-up. The company sends out over 40 million Mailgrams annually, and a spokesman said the error "is like the dozens of other computer mistakes that make the papers all the time, except this one had a different twist."

Western Union makes extensive use of stored mailing lists in a computerized data base, and the spokesman hinted that a human data entry or keying error may have precipitated the misdirected mailings.

Whatever the case, many of the nuns and priests inadvertently reached seized the opportunity for a little tongue-in-cheek reprimand directed at Milner, who had arranged to follow up the first mailing with an apology and explanation from Western Union.

"I enjoyed this note," Sister Joan Mary wrote. "However, as a grade school administrator, I was offended by the use of the double negatives!"

"The next time you are in New Orleans, please stop by," she continued, "I'm sure your tail comes to this field sometime."

Milner's Reply

"Attached is my personal donation of 50 shares of Lanier Business Products stock (worth about \$2,000) for your school," Milner replied.

"I had excellent grammar teachers, but unfortunately I still continue to use double negatives for emphasis. However, due to your reply to my misssent Mailgram, I will be more careful in the future. I'm also trying to cut down on the use of expletives."

"This was not staged in any way but was a pure Western Union error and the very pleasant responses made me feel grateful for the collective sense of humor of Catholic elementary school principals," he continued.

"Yours is the winner because of your suggestion that I follow my own advice and get my tail out in the field and call on your school. I look forward to visiting with you on my next trip to New Orleans."

Stymied in 1978

Wisconsin Facing 4% Software Tax

By Marguerite Zientara

CW Staff

MADISON, Wis. — The State of Wisconsin is again faced with the possibility of a 4% sales tax levied on computer software, in spite of a 1978 legislative solution to the problem.

As so often happens with the passage of time and the evolution of new administrations, the state's posture on the issue of software taxation has completely flip-flopped. Although a bill to tax all processing and programming work was passed and implemented in 1977, some fancy footwork by the Committee United for Tax Equity (Cute) put an end to that in 1978.

Industry activists on the issue have since been sitting pretty — until the recent introduction of a proposed regulation that would again tax the transfer of prewritten or custom computer programs.

Adapso Request

Like a bull charging the red flag, the Association of Data Processing Service Organizations, Inc. (Adapso) speedily requested a public hearing on the matter. Early last month, Kurt Kaspar, chief of technical services of the state Department of Revenue, conducted that hearing.

"Well-attended and well-presented," according to an industry representative, the meeting gave local businessmen as well as Adapso and Data Processing Management Association (DPMA) members a forum for the presentation of their oft-stated arguments against taxation.

"Members of Adapso believe that if the Department of Revenue chooses to impose a sales and use tax on software, they will have exceeded the

limits of Wisconsin law," stated Ron Palenski, Adapso's assistant general counsel.

"Wisconsin imposes their sales tax on the transfer of tangible personal property only; intangible property is not subject to sales and use taxes," he added. The association and DPMA feel that for purposes of state law, computer programs are intangible property and therefore are exempt

from sales tax.

In recent years, the following states have exempted software from sales taxes, largely through the efforts of DPMA and Adapso: Alabama, Arizona, Colorado, Florida, Louisiana, Minnesota, New Jersey, New Mexico, New York, Ohio, Rhode Island, Texas and Vermont.

No date has been set for further departmental action.

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IMC 1981 Set For Mexico City In September

MEXICO CITY, Mexico — The research directors of Eastman Kodak Co. and 3M Co. will keynote the 1981 International Micrographic Conference (IMC), slated to take place here Sept. 21-24. The theme of the conference is "Technologies — Today and Tomorrow."

Dr. Leo J. Thomas of Kodak will speak on "Emerging Technologies for the Information Industry," focusing on the role of research and development organizations in producing the optimum combinations of information system technologies. Dr. Robert McLean Adams from 3M will speak on "Dimensions of Change" regarding micrographics.

Both men are participating in the International Technology Forum entitled "Information Management Technology for the '80s," to be conducted the morning of Sept. 22. IMC will also hold sessions on engineering systems, micropublishing and computer output microfilm.

More information on IMC can be obtained from George Hoffman, Director of OEM Marketing, Business Systems Markets Division, Eastman Kodak Co., Rochester, N.Y. 14650.

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Student Saves Utah From \$800,000 Tax Snafu

By Bill Laberis
CW Staff

SALT LAKE CITY, Utah — The Utah State Tax Commission recently was able to profit from a tax return mistake because an honest teenager decided not to.

Kent Gledhill, a 17-year-old Springville High School student, opened his state tax return expecting to find a \$14.39 refund. Instead he discovered a check in his name for \$800,014.39. Except for the student's honesty, there was no guarantee that the state would ever have caught the mistake, one of a series of human-assisted computer foul-ups that unfolded at tax time in Utah earlier this year.

According to state auditor Val Oveson, the operators in the commission's DP department found a diskette "that had some problems with it." The diskette, part of an IBM System/34 that processed personal information about the state's taxpayers and those entitled to refunds, needed some Zip Codes corrected, he said.

Rather than recomposing the entire disk, the operators took the quicker

route and tried to make the correction from a data entry console.

"In trying to do this they either did not take an '8' out of the Zip Code field or put an extra '8' in or something or other," Oveson reported. "The bottom line is an '8' and some zeros ended up where they didn't belong and a lot of things happened that shouldn't have."

First of all, the operators circumvented the built-in edit checks in manually entering the corrections, because the checks had already been applied to the diskette.

And after the intended correction was entered, the state's computerized tax books were automatically updated to accommodate the newly created \$800,000 debit. That is, the books balanced after the error was created.

'Questionable, Scary'

"There are a number of audit checks we have at several levels of our operations here, so it is speculation as to whether we would have caught it," Oveson said. "I have to say it is questionable — and scary. It was really a human error and not so

much a mechanical problem."

The incident prompted immediate action from Oveson's office. Operators are now governed by new procedural rules that prevent them from making any corrections from a console. Instead an entirely new diskette must be composed.

Operators are also prevented from doing anything to data files that would circumvent the automatic edit checks.

And batch process totals, formerly reported interdepartmentally over the telephone, are now reported in writing only and are routinely dou-

ble-checked, Oveson said.

"We had a case where a batch total of \$1,990,000 got reported as \$1,190,000, and no one picked it up," he said.

To make sure that an error of such magnitude had not been repeated in the past, Oveson ordered an audit verification of all returns greater than \$5,000, an audit that he said turned up the \$800,000 error, but no others.

Now one task related to the matter remains undone — that of the state arranging for some suitable reward for the student, Oveson said.

CPA Advocates Revolution In Field's Use of Graphics

By Bob Johnson

CW New York Bureau

ORLANDO, Fla. — Claiming to be a zealot in the struggle to convince the accounting profession to accept computer graphics, Dr. Irwin M. Jarett, a professor at the Southern Illinois University School of Medicine and a certified public accountant, seemed to convert a number of people to his cause recently.

Speaking at the American Institute of Certified Public Accountants (Aicpa) computer conference, Jarett advocated a revolution in the presentation of financial data. Accountants should grasp the new graphics technology, he said, because it could ultimately simplify complicated financial procedures.

There are other reasons why accountants should embrace graphics, according to Jarett.

First is the "unbearable problem" of needless paper that management has to deal with daily. He said that graphics charts could eliminate a great deal of paper, allowing an executive merely to glance at a chart. "Who's reading all of that paper anyway?" he asked.

Secondly, Jarett said that using charts in presenting data was simply a better way to do it, noting that a chief financial officer wants to get to the bottom line quickly.

The lower cost of graphics equipment presently available is a third reason for the revolution, according to the speaker.

Standards Needed

Jarett urged attendees to make the accounting profession aware of the need for computer graphics and especially the need for a set of standards. "The ability to produce graphics has sprung upon us," he said, adding that presentation of information and reduction of paperwork are the two chief benefits of graphics systems.

The major stumbling block is that there has been virtually no research done in financial graphics, Jarett said. He conceded that there are many vendors that offer graphics systems, but noted that they do not supply anything for the financial community.

The speaker offered a major computer vendor's annual report as an example of the power of graphics in the financial world. Looking

through the report, he noticed that the company's profits were presented in red. It is common knowledge that when a company is "in the red," it is not profitable. Profits are traditionally shown in black. This type of misrepresentation could be dangerous, Jarett indicated, mentioning that the company's executive did not even realize the negative appearance.

Jarett said that the whole arena of colors is an extremely important part of graphics, especially in accounting. He suggested that computer-generated graphics for the accounting profession be developed in black and white to avoid potentially hazardous situations.

"Accountants show a lot of data. Graphics is no toy. You can make people change their behavior by using graphics," he said.

Five types of comparisons are normally done in graphic charting, according to the speaker. The correlation type is the most important to accountants because it shows current liabilities and assets. He showed examples of different graphics representations and noted that the human brain will pick up on certain patterns and make decisions without needing to know written data.

The manner in which financial graphs are presented is crucial to accountants because they can be held legally responsible for the way the data is perceived. "The pattern ability of the brain is unbelievable. It can compare industries, countries and currency by graphics representation," Jarett said.

This need for accuracy necessitates standards for accounting graphics, noted the speaker. "We're the ones to set standards. We don't want a graphics artist to present financial statements," he added.

Jarett said that he was not getting much help from the National Computer Graphics Association or from vendors when asked about assistance. He did say, however, that there is currently a major study being done at the University of Texas in this field, and there is a software model being tested at Harvard University.

It is, he concluded, the accounting profession's responsibility to push for financial graphics, and if they do not, they may fall behind for the technology.

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Wang 2200MVP Sets Quick Pace for New Series

By Hillel Segal
Special to CW

Impressive performance from Wang Laboratories, Inc.'s 2200MVP computer system has set a quick pace as we begin our columns on the Association of Computer Users' (ACU) "Series 3 Benchmark Reports." The new 12-system series covers multiuser computer systems costing between \$25,000 and \$50,000.

Over the last several months in the pages of *Computerworld*, we've reviewed the performance of 24 computers in two price ranges — \$15,000 to \$25,000, and less than \$15,000. All those computers were tested by independent consultants using standard benchmark applications for business and science and speed tests to check out system components.

Now, as we embark on Series 3, the tests are changing, and the runtimes we'll report for the higher priced systems will not be directly comparable to times for the previously reviewed 24 systems. There are CPU-intensive and I/O-intensive tests in the full reports that are comparable to times in the Series 1 and 2 reports.

In order to develop a capability for testing multiuser systems, ACU's consultants came up with an eight-terminal simulator that acts as if it were eight operators typing data into the system under test. The benchmark tests using an order entry program simulate an actual application using two to eight terminals.

The order entry program is run first for two, four, six and eight terminals with no other tasks running. Then a CPU-intensive program is run in background while the order entry test is again run with two to eight terminals. Thus, it is possible to gauge response time variations both with and without background operations.

The times shown here for test E-4 represent the completion time of the background CPU task in one column, with the other column being the response time per 12-line transaction when eight terminals are operating simultaneously in the order entry test. To estimate how long the system would take in responding to a one-line operator entry, divide the listed order entry figure by 12.

Wang's times in both segments of the test were excellent. We will be comparing them in future issues to times obtained with the IBM Se-

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System: Wang 2200MVP
Current Price: \$30,000 with one terminal
\$46,900 with eight terminals

Series 3 Results

Wang 2200MVP
IBM Series/1
TI DS990 Model 4
Hewlett-Packard 250
DEC Datasystem-355
Alpha Micro AM-100T

CPU-Intensive
(Run in
Background)

Time
16.4 Sec

Test E-4

Order Entry
Response Time
(Eight Terminals
Simultaneously)

Time
4.6 Sec

To be covered in
future issues

ries/1, Texas Instruments, Inc. DS990 Model 4, Hewlett-Packard Co. 250, Digital Equipment Corp. Datasystem 355, Alpha Micro, Inc. AM-100T and others.

Eight-inch diskette drives are available as well, supplying from 250K bytes to 750K bytes. In all, the maximum on-line storage, with six drives connected, is 484M bytes. It should

This is the 29th in a series of articles giving the highlights of benchmark tests conducted on popular, small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

In memory, 5M bytes of hard-disk storage, two four-port terminal controllers and a 200 char./sec matrix printer. With one terminal, the price of the system is \$30,000. With eight terminals, the system costs \$46,900.

The CPU is expandable from 32K bytes to 256K bytes of central memory and contains nine I/O slots for controller boards. The 2260C series of hard-disk drives offers anywhere from 2.5M- to 20M bytes of storage, split evenly between fixed and removable.

Wang also offers the 2280 series, which can store up to 80.8M bytes.

be noted that of the 10 MVP users interviewed, however, several reported mechanical difficulties with the 10M-byte drive.

For I/O devices, Wang offers a matrix printer, a line printer, a band printer and a flatbed plotter. Two terminals are available — interactive and graphics CRT. In addition, Wang offers asynchronous and bisynchronous telecommunications controllers and a bisynchronous controller for IBM 3275 emulation. Our consultants found the interactive terminal to be easy on the eyes and the touch on the keyboards to be very good.

Built-In Operating System

Perhaps the most interesting feature of the 2200MVP is its built-in operating system. The operating system is completely transparent to the user — all system commands are either Basic-2 functions or commands. In most systems, errors are corrected by editing, compiling, linking, loading and then executing. On the MVP, all one does is replace the erroneous line and run it.

Another useful feature offered by the MVP is global partitions. User memory consists of four "banks," each of which can be further divided into partitions with a minimum size of 1.25K bytes. A partition can dynamically declare itself global, thereby making its subroutines and vari-

ables accessible to other partitions.

Thus, different programs can execute the same subroutine simultaneously, and global variables can be read and modified by several users, providing a mechanism for interpartition communication.

In general, users seemed to be very pleased with the 2200MVP operating system. As one programmer remarked: "The interactive usage is great. You just stop the program, make corrections and restart. It's very nice to use."

One Language

The only language available on the MVP is Wang's own Basic-2. However, Wang also offers Inquiry Data Entry Access System (Ideas), which can be used to create and maintain data files, generate screen formats and menus and print reports. Because Ideas creates Basic-2 code to accomplish these tasks, the utility can be customized for specific uses.

There is a great deal of application software available for the MVP. Some of it is offered by Wang, but the greater part is available through independent vendors.

Wang's largest software system is GBS, a set of packages that includes invoicing, accounts receivable, sales analysis, order entry, inventory, general ledger, accounts payable and payroll.

Wang's Basic-2 is a very powerful version of Basic. It permits logical operations at the bit and byte level and has special statements for code conversion, sorting and matrix arithmetic. The only complaint about the language came from a user who commented that the short variable names make programs more difficult to document and maintain.

Training and Support

The most serious criticisms of the 2200MVP came in the area of customer support and training. Wang's philosophy is to supply the hardware and leave the software to its approved vendors. As a result, its hardware support (including documentation) is very good, while its software support is almost nonexistent. As one user put it: "Wang's technical service is great, but the sales service and follow-up is very poor. There was no information available on software."

Another user remarked: "Hardware documentation is very good. However, the software documentation is incomplete and not too good. It may be six months to a year behind the actual version of the system which is up and running."

In sum, ACU found the Wang 2200MVP to be a fast, dependable machine with a powerful and friendly operating system. Potential buyers, however, should make sure the software they need is available and has proper documentation.

Hillel Segal is president of the Association of Computer Users, a nonprofit association with members in the U.S., Canada and several other foreign countries. A package of information about the Association of Computer Users is available from the group at P.O. Box 9003, Boulder, Colo. 80301.

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Larger Memories Seen Fuel For Future Robotics

By Bruce Hoard

CW Staff

BRIGHTON, England — The availability of larger computer memories at lower prices will fuel the robotics industry as it reaches into the '80s, according to Douglas Hall, founder and president of Hall Automation, Britain's most successful robotics company.

Taking a brief respite from the crowds besieging him here at the recent Automan '81 conference on robotics and automation, the affable Hall talked with *Computerworld* about his past and the future of robotics.

Hall's robot roots go back to 1966, when he formed the automatic handling division of Hawkes Siddeley Dynamics, an English aerospace firm.

"At the time, we took out a license from AMF in the states to make Versatin (versible transfer)," he observed. "I ran the division until 1973 and started Hall Automation in 1974."

Larger computer memories at lower prices are critical to the evolution of robots because they will make them smarter and alleviate the vision deficiencies now hobbling development, he said.

Today's vision systems are "relatively slow" because of a lack of computing power. More power means more resolution to the images robots "see," he explained.

Future Advances

Within three years, vision systems will have advanced to the point where robots will be able to quickly distinguish different items in a bin and select them when ordered to do so, he predicted.

His own firm is "keeping a watchful brief" on vision research, but leaving the serious development to its parent company, GEC Marconi Electronics, which is tackling the task at its two research labs.

The president anticipates his company will take in 1.5 million pounds, or roughly 3 million dollars, during 1981. "Business is good," he said. Painting, or more accurate-

ly, "coating," is currently one of the most popular robotics applications, he said. The process can involve paint, adhesives or metal, and robots can apply the materials more consistently than humans, he observed.

Arc welding looms as the next big application, but "that is linked back to the vision problem again," Hall said. A typical robot system includes the robot arm me-

chanical unit, a power source and a computer control system. Hydraulic power sources are currently the most popular, followed by electric and pneumatic, he added.

"Hall Automation employs a dedicated electronic system based on a Texas Instruments, Inc. 9900 microprocessor chip," he said. "It is a 16-bit device and all peripheral equipment is dedi-

cated to the design and built by us. The microprocessor features 35K bytes of memory per memory module."

Why Robotics?

The typical robot system Hall spoke of costs about 50,000 pounds, so why should anybody spend that kind of money?

"It's just a question of really analyzing the factors at the particular installation in de-

tail," Hall said. "People don't always understand in a sufficient manner the process details of a job, even though they may be running it."

"Look at the whole picture. If a man does something wrong and a part moves on down the line, how much will it cost to recover that part?" It must either be scrapped or rectified, and both alternatives are expensive, he asserted.



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Robotics Won't Replace Humans: Consultant

By Bruce Hoard
CW Staff

BRIGHTON, England — Managers, engineers, operators and maintenance personnel must all be taken into consideration when implementing robotics, David Teale, automation consultant for IBM United Kingdom Laboratories, Ltd., said at Automan '81 here recently.

In addition to discussing the impacts of robots on hu-

mans, Teale laid out a laundry list of dos and don'ts for first-time robot users.

- Senior management must always be committed in order to pull off a successful robot implementation, he said, echoing a refrain commonly heard in connection with new technology.

- Engineers who will be working with the robot must have a basic knowledge of the machine. They should

draw up a list of possible applications, none of which should be too innovative. "Don't break new ground with your first machine," Teale declared.

- Operators are primarily worried about labor redundancy, but attrition is usually high enough to offset job displacement, he said. Remember not to set time standards for humans who do the same work as robots, he added.

- Although robot maintenance training opportunities are scarce right now, he called for highly trained maintenance technicians. They should ideally have knowledge of electronics, engineering and programming.

- Engineers should be excluded from some stages of the robot acquisition process, Teale said. For instance, the purchasing department

should be responsible for getting all price quotes and the finance department should also be asked to evaluate the long-term returns involved.

"Engineers can't deal with return on investment," he observed.

Role of Operators

When the robot has been debugged, it is wise to move the engineers out and bring the operators in, Teale advised. The operators are more likely to discover the "little niggling problems" engineers would overlook.

Operators are also the right people to consult when compiling a list of applications because it is they who deal with the kind of jobs robots are designed to handle.

Looking at costs, Teale called a company's first robot "an investment in the future." In order to defray its costs, the company should appeal to the government for whatever grants may be available.

Ancillary tooling, in the form of extra grippers or feeders, may be as much as one-third of installation costs, he said. Other running costs include rearrangement of the work place to accommodate the robot and training costs for operators, maintenance people and engineers.

Technical Questions

Technical questions to be asked include: Is there a robot that can do the job already? "Don't try to reinvent the wheel," Teale noted. Also, is the job too complex for a first application, what are the ancillary tooling costs and what sensors are needed?

The robot must be flexible, economical and able to perform a wide range of applications. It should also be easily programmable. Brand-name robots usually involve lower training costs, he added.

Buyers should check the number of degrees of freedom a robot has. Most have five or six. Check out the load capacity, too, Teale advised.

In checking out the reach, ask if there is reduced load capacity at full extension.

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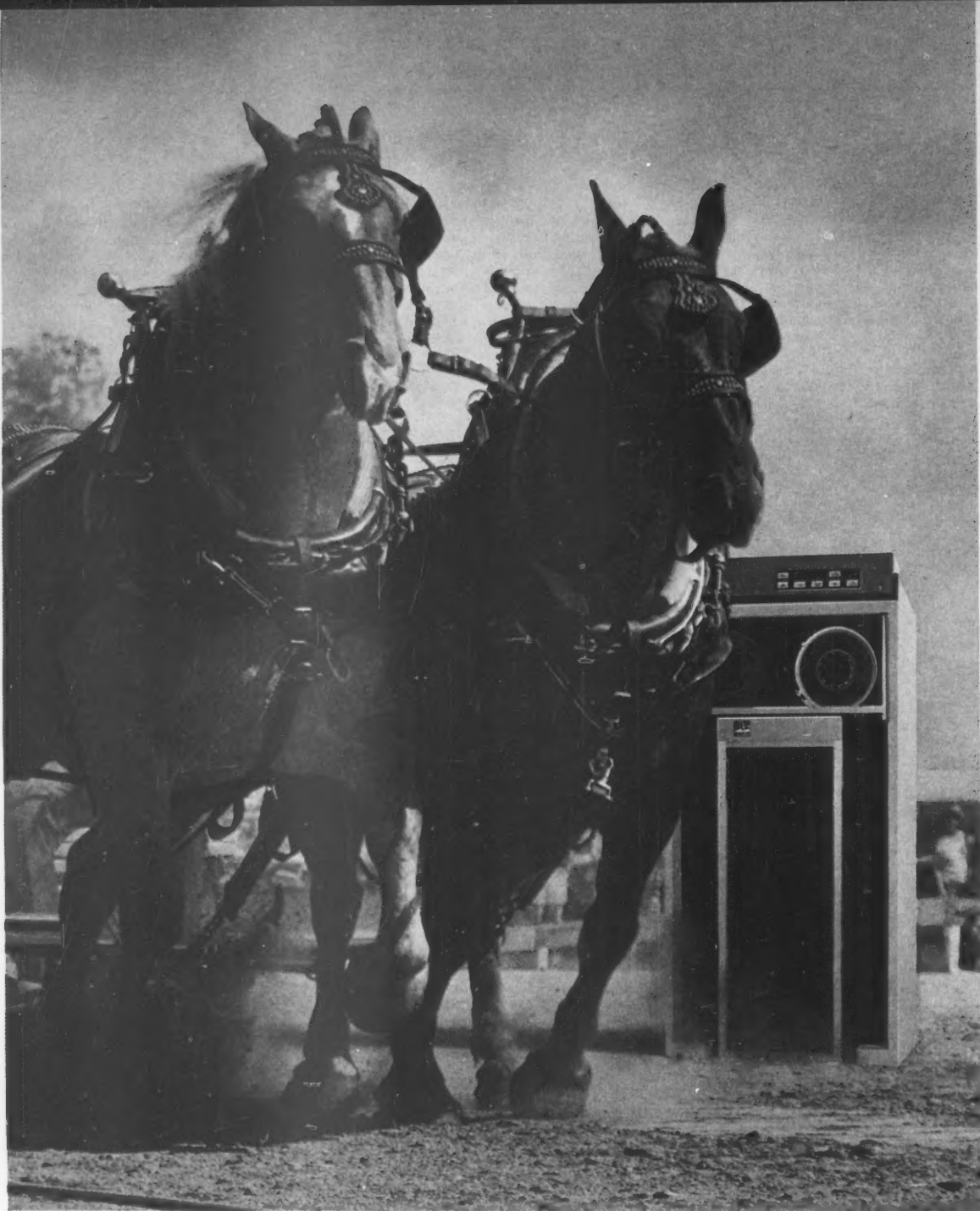
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Seeks 'Risk-Taking Mentality'

Thatcher Exhorts Move to Robotics for Britain

By Bruce Hoard

CW Staff

BRIGHTON, England — "I really have only one reason for being here today," British Prime Minister Margaret Thatcher told Automan '81 attendees during her opening remarks here recently, "and that is to show that Britain must be in the latest technology and must apply it."

Thatcher decried her country's lack of technological initiative and exhorted it to move forward as she opened this show, which melded together the annual conferences of the British Robot Association (BRA) and Assembly Automation. The BRA sponsored the gathering.

The prime minister was followed by Joseph Engelberger, president of Unimation, Inc. and widely acknowledged as "the father of robotics."

Although Britain has produced many Nobel Prize winners, it has failed to convert its mental muscle into "spectacular industrial success," Thatcher noted. England needs the "risk-taking mentality" that will create and build up new technology, she added.

The prime minister, who arrived here with a small security contingent, was quick to defend the sociological aspects of increased automation. "New technology has not taken away jobs, it has created them," she asserted.

During the first Industrial Revolution, workers feared the advent of machinery would lead to unsafe working conditions. Those objections were grounded in truth then, but they no longer apply, she claimed.

For example, a robot will put its hand into a hot oven or check a truck for an unexploded bomb. "Surely, that's better than asking a soldier to do it," she maintained.

If Victorians had been asked their views on the development of the internal combustion engine, they would have called it "disastrous," but it is far easier to condemn new technology than assess its long-term benefits, she observed.

Threat of Failure

"The only threat is the threat of failure," Thatcher told her audience in an increasingly strident tone. "That is a failure that will face the companies who do not grasp the opportunity of robotics. They will go out of business and those jobs will truly be lost."

It is ironic that those who rush to condemn new technology are the same people who then turn to other countries to buy it, she said.

The prime minister ticked off a list of countries, their robot populations and their rates of unemployment. Japan, the world leader with 6,000 industrial robots, has a 2.4% unemployment rate. Germany has 1,250 robots and a 4% unemployment rate, she said.

England has only 370 robots, and, "I don't have to tell you what the level of unemployment is here. Is the message clear?" she asked.

The British unemployment rate is currently hovering at about 15%. In

1980, unemployment rose by approximately 900,000 persons.

"Technological progress is as inevitable as the march of time and we of Britain must march with it," she commented.

The balding and bespectacled Engelberger guided the gathering through a list of robot applications and called it "a wide field and a growing one." The current cost of the average worker in the U.S. automotive industry, with all fringe benefits included, is \$19 per hour, he said. If, however, automobile manufacturers would spend a one-time fee of \$50,000 per industrial robot and depreciate that cost over eight years,

the robot would cost only \$5.50 per hour in the long term, he claimed.

"An auto manufacturer that ignores that, does so at his own peril," he continued. "You either do something about it or you lose your position." The increased benefits gained from robotics may be channeled into controlling pollution or even the third world, he said. But, "If you don't get the benefits, you don't have any options."

Key Senses

Engelberger mentioned seeing (vision), feeling (tactile sensing) and hearing (voice communications) as the three key robotics senses. Today,

robots are able to distinguish separated parts; by mid-decade, they will be able to do the same with jumbled parts. "That would alleviate the bin-picking problem," he observed.

Looking off into the future, the Unimation president pondered the possibilities of robots shearing sheep ("a bloody job now") and even cooking "Big Mac" hamburgers.

Engelberger donned a Japanese robe during his discourse on incursions by the Japanese into robotics. "The big thing Japan has done is taken the technology and accepted what is good and marketed it aggressively," he said. "If it is good, let us do something with it."



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Trade Press Criticized for Taking Safe Route

By Brad Schultz

CW Staff

CHICAGO — The computer press does what it does rather well, but fails to do other things that would benefit users and society, according to a paper written by two computer science professors for a recent conference here.

Speaking at "A Journalists Panel on Trends in Computing," Dr. John L. King said the press — specific to computing — tends to reinforce the positive feelings its audience has about the technology's social impacts by running "upbeat" articles rather than by rocking the boat. King wrote the paper critiquing the computer trade press in collaboration with University of California at Irvine colleague Rob Kling.

Joining King on the panel were the editors of *Datamation*, *MIS Week*, *Computer Careers News*, *Computer Law & Tax Report* and *Computing* (a British magazine) as well as this writer, who chaired the session.

News for Consumer

In the paper, King and Kling said they believed "the trade press as a whole provides very competent and important information service to an audience consisting of computer producers, OEM firms and those concerned with the evolution of computing products in computer-using organizations."

But the trade press usually fails to provide detailed news of interest to consumers of computer-based services, subjects of the data stored on computers and the larger public concerned about what computing does to the world, the professors maintained.

"It is simply difficult to find reliable information about the operations, design alternatives, costs, policy choices and consequences of different modes of automation," they wrote.

"If *Computerworld* acted as *New York Times*, and *Datamation* acted as a computational blend of *Scientific American* and *Harper's*, we would all be better served," the computer scientists added.

Seamy Side of DP

The journalists on the panel discussed with the audience problems the trade press has in investigating the seamier side of computing.

Datamation editor John L. Kirkley pointed out that journals are under pressure to give their audience what it wants.

In the case of journals such as CW that aim at the manager of DP or information sys-

tems, the audience has indicated it primarily wants news of product introductions, users' experiences with products and trends that affect the routine practice of DP.

Other aspects of computing, such as news of abuse, bungled implementations and negative social impacts, are not irrelevant for such journals, but readers generally find them less important.

Kirkley and other trade editors suggested.

From the audience, an attendee commented that academics could do more to publicize what they see computing doing to the quality of life.

The investigative reporting capabilities of the trade press are necessarily limited, he asserted, while academics such as King and Kling who specialize in the social impacts

of computing are often more capable of uncovering those impacts that are negative.

Upbeat Bias

Among reasons King and Kling cited for the upbeat bias they perceive in the computer trade press was the fact that much of its news is derived from press releases and other literature turned out by organizations whose success hinges on whether

people are enthusiastic about computing.

The sources of information that computer journalists turn into news copy emphasize that "what is good is what is 'well-managed,'" the session paper declared. Thus, negative effects of computing, when they are reported, tend to be blamed on quality of management rather than inherent qualities of the technology being managed.



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Managers on the Move

LINDA T. TAYLOR has been appointed director of information and management systems at Filmways, Inc. in Los Angeles.

Taylor's previous experience includes four years as manager of software engineering at Systems Development Corp. and three years as manager of financial systems at Transaction Technology, Inc.

Taylor holds an interdisci-

plinary M.S. degree from West Coast University in business administration and computer science.

...

MICHAEL BILOTTI has been named vice-president of information services at Zayre Corp. in Framingham, Mass.

Bilotti joined Zayre in 1977 as manager of terminal systems and was promoted to

assistant vice-president and distributed information systems director in 1978.

Bilotti holds a B.S. degree in electrical engineering from Syracuse University.

...

RICHARD A. HANN has been appointed general manager of systems operations for Montgomery Ward of Chicago.

Prior to his present assign-

ment, Hann was corporate information processing director, a position he has held since 1979.

Hann holds a B.A. degree in economics from Baker University.

...

RICHARD L. THOMAS has joined Doane Agricultural Service, Inc. of St. Louis, Mo., as manager of the Data Processing Department.

Prior to joining Doane, Thomas was a DP manager at Monsanto Co.

Thomas received his B.S. degree from the University of Maryland, where he majored in Business and Computer Science.

...

FRANKLIN GUEST has joined Crum & Forster Corp. (CFC) as an assistant vice-president in the Information Services Department in Morristown, N.J.

Before coming to CFC, Guest served as assistant vice-president of management information systems with J.H. Blades & Co., a Crum and Forster organization. Guest joined Blades in 1973 as DP manager.

Guest holds a B.B.A. degree in management information systems from the University of Houston. He is a member of the Association for Systems Management.

MIT Plans Short Courses

CAMBRIDGE, Mass. — "Advanced Software Concepts — Operating Systems" and "Key Aspects of Information System Technologies: Data Base Systems, Telecommunication and Performance Evaluation" are two short courses being offered at MIT this summer.

The first course will be presented by Prof. John Donovan, Sloan School of Management, July 27-31. The second will be given by Stuart Madnick, also of Sloan, Aug. 3-7. The two courses were designed for senior programmers, analysts and managers who are familiar with computer systems and high-level languages.

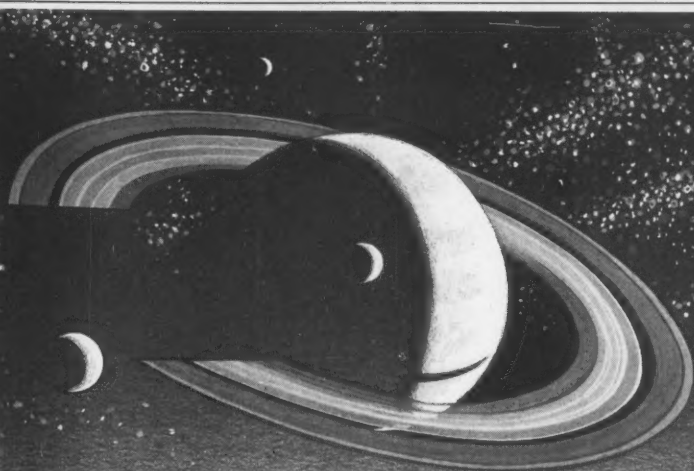
Details can be obtained from the Office of the Summer Session, Room E19-356, MIT, Cambridge, Mass. 02139.

Courses Set For Deaf Adults

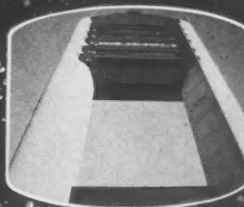
ROCHESTER, N.Y. — Rochester Institute of Technology (RIT) will offer two computer courses for deaf adults this summer through the National Technical Institute for the Deaf (NTID).

Introduction to Data Processing is scheduled for Aug. 3-7 and will provide deaf adults with basic technical skills relevant to computer job situations, the institute said. Advanced Data Processing is slated for Aug. 10-14.

Tuition is \$100 per person; room and board is an additional \$115. Further details are available from Donald Beil, NTID Data Processing Department, RIT, One Lomb Drive, Rochester, N.Y. 14623.



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Calendar

June 15-16, Denver — **The Engineer as Manager.** Contact: Battelle, Inc., 4000 N.E. 41 St., P.O. Box C-5395, Seattle, Wash. 98105. Also being held June 18-19 in Boston and July 16-17 in St. Louis.

June 15-16, Boston — **Software Operational Support in the 1980's.** Contact: AIAA Conferences, Suite 1010, 5959 W. Century Blvd., Los Angeles, Calif. 90009.

June 15-17, Boston — **EDP Disaster Recovery: How to Develop, Test and Maintain a Plan.** Contact: EDP Security, Inc., 181 West St., Waltham, Mass. 01254.

June 15-16, Washington, D.C. — **Management of Project Documentation.** Contact: Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

June 15-17, Philadelphia — **Project Management & Control.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181. Also being held June 17-19 in Raleigh, N.C.

June 15-19, Chicago — **Computer Performance Measurement and Capacity Planning.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 15-17, Denver — **Advanced Programming Techniques.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 15-19, Washington, D.C. — **Effective Management of Programming Projects.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 15-17, Toronto — **Data '81, Canada's Fourth Annual Datacomm Conference & Exhibition.** Contact: Laurie Whitshed, Whitshed Publishing Limited, Suite 1201, 55 Bloor Street W., Toronto, Ont. M4W 3K2.

June 15-17, Washington, D.C. — **How To Reduce Data Processing Costs.** Contact: Management Resources International, Inc., 6621 Electronic Drive, Springfield, Va. 22151.

June 15-19, Boston — **Communicating Technical Information.** Contact: Office of the Summer Session, Room E19-356, MIT, Cambridge, Mass. 02139.

June 15-16, Dallas — **User Documentation Seminars.** Contact: American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held June 22-23 in Boston and June 25-26 in New York.

June 15-16, Niagara Falls, N.Y. — **Meeting of the Mumps Development Committee.** Contact: George F.

Timson, Secretary, 1703 Gough St., San Francisco, Calif. 94109.

June 15-17, Washington, D.C. — **Configuration Management of Software Programs.** Contact: Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

June 15-17, Madison, Wis. — **Surge Protection of Telecommunications Systems.**

Contact: Francis Drake, University of Wisconsin Extension, 432 N. Lake St., Madison, Wis. 53706.

June 15-16, New York — **Understanding Modern PBX Systems.** Contact: Business Communications Review, 36 S. Washington St., Hinsdale, Ill. 60521.

June 15-16, Dallas — **Capacity Management Forums.** Contact: Boole & Babage, Inc., 510 Oakmead

Parkway, Sunnyvale, Calif. 94086. Also being held June 24-25 in Los Angeles.

June 15-19, Short Hills, N.J. — **Design Techniques Workshop.** Contact: BSI, 4720 Montgomery Lane, Bethesda, Md. 20814.

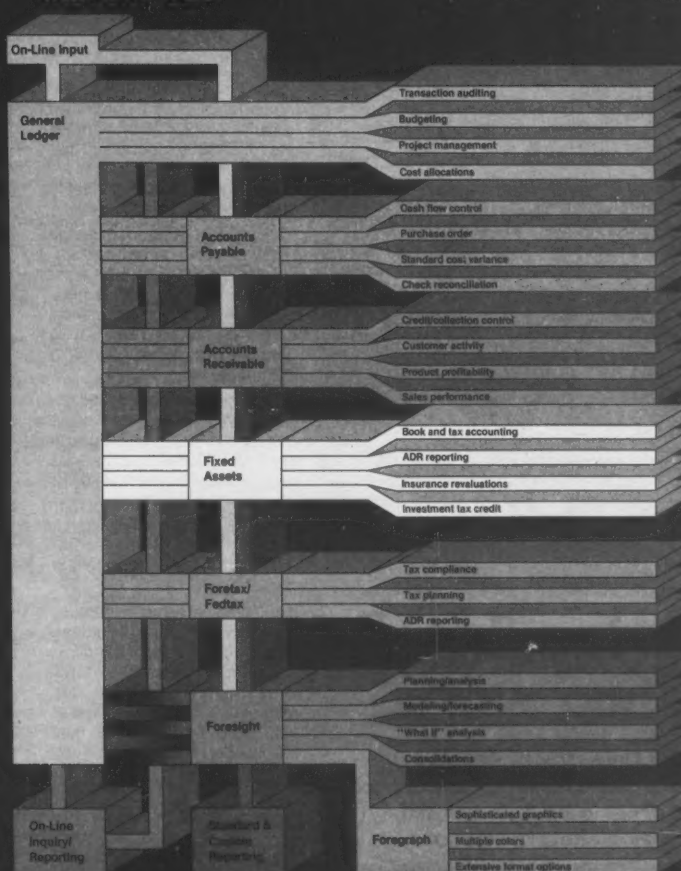
June 15-19, New York — **Systems Design Techniques.** Contact: Advanced Training Center, Division of Chubb Institute, 480 Morris Ave., Summit, N.J. 07901.

June 15-26, Madison, Wis. — **Computer Techniques for Real-Time Control & Monitoring of Power Systems.** Contact: Willis F. Long, University of Wisconsin Extension, 432 N. Lake St., Madison, Wis. 53706.

June 16-18, Philadelphia — **Data Base Fundamentals.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, (Continued on Page 34)

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Calendar

(Continued from Page 33)
Mass. 02181.

June 16-19, Boston — **Leadership: Managing & Influencing People.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

June 16-19, Raleigh, N.C. — **Structured Programming — Techniques for Productivity.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley,

Mass. 02181.

June 16, New York — **UCC Eleven Seminar: Automated Rerun and Tracking.** Contact: University Computing Company, UCC Tower, Exchange Park, Dallas, Texas 75235. Also being held June 17 in Chicago and June 18 in San Francisco.

June 16-17, Bethlehem, Pa. — **Management of the Information Services Function.** Contact: Faith Newhall,

Packard Lab-19, Lehigh University, Bethlehem, Pa. 18015.

June 16-19, Lancaster, Pa. — **Association of Data Communications Users Fourth National Meeting.** Contact: Dave Rubin, Network Analysis Corp., 130 Steamboat Road, Great Neck, N.Y. 11024.

June 17-19, Atlanta — **Distributed Processing — A Practical Guide.** Contact:

Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 17-19, Washington, D.C. — **Data Base in a Distributed Processing Environment.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 17-19, Washington, D.C. — **Data Communications: Components, Systems**

and Networks. Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 17-18, New York — **Financial Analysis For Telecommunications Professionals.** Contact: Business Communications Review, 36 S. Washington St., Hinsdale, Ill. 60521.

June 17-19, Denton, Texas — **National Educational Computing Conference '81.** Contact: Dr. James L. Poirot, North Texas State University, P.O. Box 13886, Denton, Texas 76203.

June 17-19, Atlantic City, N.J. — **Atlantic City Productivity Management Seminar.** Contact: Raymond Smith, Keane, Inc., 210 Commercial St., Boston, Mass. 02109.

June 18-19, Boston — **EDP Disaster Recovery: Advanced Techniques.** Contact: EDP Security, Inc., 181 West St., Waltham, Mass. 02154.

June 22-24, Hartford, Conn. — **Strategic Information Systems Planning.** Contact: Infocom, Inc., MRB Box 125-17, Bangor, Maine 04401.

June 22-23, Blacksburg, Va. — **Digital Electronics for Automation and Instrumentation.** Contact: Linda Leffel, C.E.C., Virginia Tech., Blacksburg, Va. 24061.

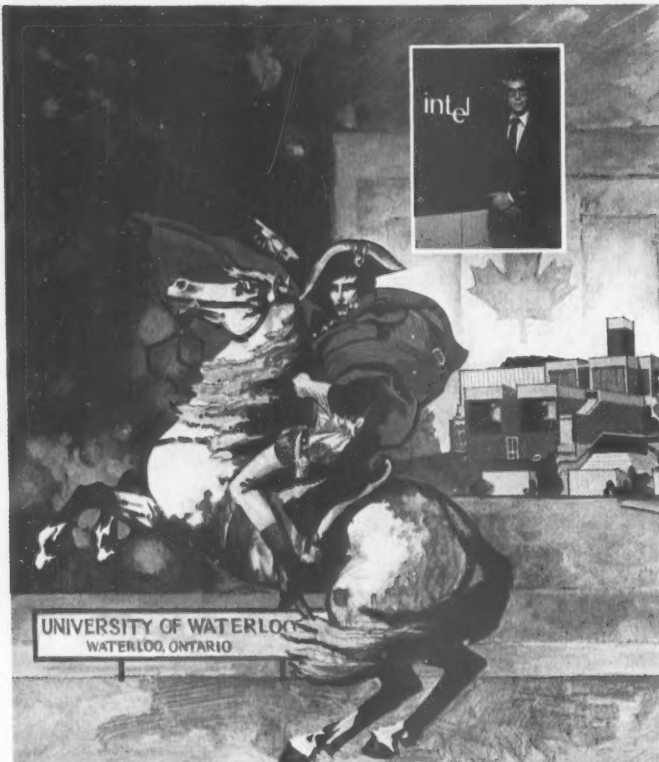
June 22, Dallas — **Stradis, Management Overview of Structured Systems Development Methodology.** Contact: Herm Rubin, Dept. K604, Box 516, St. Louis, Mo. 63166. Also being held June 24 in Cleveland and June 26 in Chicago.

June 22-25, Kansas City, Mo. — **SRD/Structured Requirements.** Contact: Ken Orr & Associates, Inc., 715 E. Eighth, Topeka, Kan. 66607.

June 22-26, Houston — **Structured Systems Design/Structured Requirements Definition.** Contact: Ken Orr & Associates, Inc., 715 E. Eighth, Topeka, Kan. 66607.

June 22-24, Raleigh, N.C. — **Structured Techniques for Systems Design.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

(Continued on Page 35)



At Waterloo, Intel's FAST-3805 won.

The FAST-3805 saves the University of Waterloo thousands of dollars each month while it increases both user and system productivity. Waterloo's Associate Director-Systems, Romney White, explains how...

"Compared to any other DASD, the FAST-3805 in Native Mode* is the fastest thing going. It has a large enough capacity to satisfy the biggest users around, and it's a cost-effective solution. In other words, the FAST-3805 is really an ideal paging device.

"The FAST-3805 reduces paging overhead and increases paging capacity. It's an economical solution for extending current CPU resources."

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"We discovered that our 4341 by itself supported only 25 active users. With the FAST-3805 we

were able to double the number of active users at less than half the cost of a new processor. And those users got more consistent and faster response times.

"We found the FAST-3805 eliminated page wait and the page wait that masquerades as I/O wait, as well as reduced device, controller and channel contention. The result was more users who are more satisfied."

Fast paging saves dollars

"On our 3031 we had a page wait of about three percent with two 2305s. However, when we switched to a FAST-3805—which

brought in pages about two and a half times faster than the 2305s—the page wait went to zero. In our situation, switching to the FAST-3805 saved us a couple of thousand dollars a month in system and people time. But a user who has a 3033 with a 15 percent page wait could save \$15,000 to \$20,000 a month.

"Not only did the FAST-3805 take the place of two 2305s and a 2835 controller at Waterloo, but it helped us avoid the purchase of another 2305/2835 system. With the FAST-3805's increased capacity, we were able to stay within our budget... and still meet the increased needs of our users.

"Because we wanted to get the most out of our current system, we saw the FAST-3805 as a good investment. We looked at the available paging devices and determined that the FAST-3805, because of its micro-coding, offered the most flexibility.

"The installation was a breeze. Service has been good—and the unit is essentially self-diagnosing. The FAST-3805 is much more reliable than our previous disks.

"In summary, Waterloo got more capacity, better performance and better reliability for less money with Intel's FAST-3805 semiconductor disk."

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PACIFIC TELECOMMUNICATIONS CONFERENCE '82 (PTC '82), Honolulu, Jan. 18-20, 1982.

Issues to be addressed include: Telecommunications infrastructure and needs; self-sufficiency in meeting telecommunications demands; availability and application of equipment and services; standards and compatibility; manpower and training; role of multinational corporations and industrialized nations in telecommunications; social and economic implications of the introduction of telecommunications technology to developing areas; international flow and control of news and information; rates, tariffs, economics and investment capital.

Papers are requested in these and other issue areas. Authors should submit drafts of approximately 10 pages by July 30 to Richard J. Barber, Conference Director PTC '82, Suite 303, 1110 University Ave., Honolulu, Hawaii 96826.

INTERNATIONAL CONGRESS ON TECHNOLOGY AND TECHNOLOGY EXCHANGE (ICTTE), Pittsburgh, Pa., May 3-6, 1982.

A call for papers has been issued for this symposium on the following topics: robotics; computers; word processing; communications; planning, transfer and

exchange of technology; new technologies and their legal, governmental and socioeconomic ramifications.

Abstracts not longer than 500 words should be submitted as soon as possible

to ICTTE, Engineers' Society, William Penn Hotel, 530 William Penn Place, Pittsburgh, Pa. 15219. Completed papers should describe completed studies or programs as well as progress reports

describing work in progress with significant intermediate results. These should be typewritten, double-spaced and not longer than 20 pages including tables and graphs.

SOFTWARE DOCUMENTATION WORKSHOP, Gaithersburg, Md., March 3, 1982.

Possible subject areas for papers include case studies of user experience with Federal Information Processing Standards (FIPS) guidelines on documentation, need for compatibility of documentation stands, need for additional guidance on documentation, need for clarification of terms and definitions pertaining to documentation, management guidelines for documentation, automated documentation and quality criteria for documentation.

Story ideas should be submitted for approval by June 30 to A.J. Neumann, Institute for Computer Sciences and Technology, National Bureau of Standards, Technology A265, Washington, D.C. 20234.

NATIONAL COMPUTER CONFERENCE 1982, Houston, June 7-10, 1982.

Papers are invited on all aspects of computing: hardware, software, information processing management, applications and social and economic implications.

Submissions, proposals and requests for "Instructions to Authors" should be sent before Sept. 15 to Howard Morgan, Program Chairman NCC '82, Dept. of Decision Sciences, The Wharton School/CC, University of Pennsylvania, Philadelphia, Pa. 19104.

Calendar

(Continued from Page 34)

June 22-24, Boston — EDP Quality Assurance. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

June 22-25, Boston — Network Analysis and Design Workshop. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

June 22-26, Philadelphia — Data Analysis/Data Base Design. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

June 22-24, Denver — Data Communications Network Design. Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 22-24, Denver — Systems Analysis and Design Workshop. Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 22-24, New York — Effective Writing for the DP Professional. Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 22-24, San Francisco

— EDP Operations: Effective Practices and Procedures. Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 22-24, Washington, D.C. — Structured Testing. Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

June 22-24, Kansas City — Project Leadership Workshop. Contact: BSI, 4720 Montgomery Lane, Bethesda, Md. 20014.

June 22-25, Chicago — Computer Security Conference. Contact: American Society for Industrial Security, Suite 651, 2000 K St., NW, Washington, D.C. 20006.

June 22, Boston — New England Computer Measurement Group. Contact: Hank Janson, BGS Systems, 470 Totten Pond Road, Waltham, Mass. 02254.

June 22-24, Boston — Developing Computer-Based Marketing Information Systems. Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

June 22-25, San Jose, Calif. — Data Communications Software Course. Contact: Systar Corp., Suite 208, 1762 Technology Drive, San Jose, Calif. 95110.

June 22-24, Chicago — SAS CPE Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

June 22-24, Boston — National Packaged Software Conference. Contact: The Institute for Science and Public Affairs, 1370 Avenue of the Americas, New York, N.Y. 10019.

June 22-July 1, Berkeley, Calif. — Teaching Structured Design and Structured Programming. Contact: UC Berkeley Extension, 2223 Fulton St., Berkeley, Calif. 94720.

June 23-25, Bethlehem, Pa. — Strategic Planning for Information Services. Contact: Faith Newhall, Packard Lab-19, Lehigh University, Bethlehem, Pa. 18015.

June 23, Chicago — Telecom Trends and Developments in 1981. Contact: Business Communications Review, 36 S. Washington St., Hinsdale, Ill. 60521.

June 24-26, Atlantic City, N.J. — Computer Industry Trade Expo. Contact: Computer Industry Trade Expo, 110 Charlotte Place, Englewood Cliffs, N.J. 07632.

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EDITORIAL

The Latest on IBM, X.25

An IBM official has admitted that IBM has offered X.25 compatibility to U.S. customers of the Series/1 minicomputer since fourth quarter 1980 [CW, May 25]. On several occasions last year, IBM spokesmen said their company would not provide compatibility with the communications protocol before AT&T, which so far has not done so in commercially available facilities.

Major North American public data networks are based on X.25, as are public data networks on other continents, where many U.S. businesses operate. Without X.25 compatibility, DP users have difficulty accessing those networks, which could render substantial cost advantages over common carrier offerings.

IBM does offer X.25 compatibility, through add-on hardware devices, in several foreign countries, but has withheld domestic support in the best interests of U.S. customers, company spokesmen have steadfastly maintained. This official policy was publicized in a written IBM "statement of direction" about a year ago.

Nevertheless, a Series/1 product administrator conceded that a bridge between IBM's Systems Network Architecture (SNA) and the X.25 protocol standard recommended by the Consultative Committee on International Telephone and Telegraph is available as a package that consists of a software product and two circuit cards. The software (IBM code number 5799-TCP-PRPQ P1008) costs \$2,500 and may be leased, while the circuit cards (code number RPQ 8T1067) go for \$1,785 each.

This represents only limited support for X.25 on the part of IBM's General Systems Division (GSD), not the Data Processing Division that markets mainframes. But several independent vendors have made the Series/1 the basis of front-end communications processors and switching systems, resulting in a situation where retooled Series/1s now serve as critical extensions of IBM mainframes for a growing number of DP users.

A sizable user community can therefore be encouraged by the news of X.25 compatibility for the Series/1, but many must wonder at the confusion IBM spokesmen have created. IBM did not admit the compatibility existed until recently, and several high-ranking IBM spokesmen now seem less than candid or helpful in light of their assertions that domestic X.25 support hinged on AT&T making the first move.

Some large IBM sales accounts have pressured IBM to deliver X.25 domestically, reflecting their worldwide commercial interests and dependence on public data networks. It now seems fair to ask whether IBM chose to quietly grant the support to certain customers, while keeping most customers ignorant of the support's availability.

Data communications experts have alleged that widespread marketing of X.25 support would threaten IBM's investment in several existing product lines. What does IBM say to that?

DATA PAST

Five Years Ago May 31, 1976

NEW YORK — Hewlett-Packard Co. introduced its HP 3000 Series II, which featured a faster CPU, faster memory and an enhanced operating system that combined to produce "two to six times the throughput" of its HP 3000 predecessor, according to the firm. Users of HP 3000s could field-upgrade to the Series II's 256K version for \$75,000.

Ten Years Ago June 2, 1971

WASHINGTON, D.C. — The Federal Communications Commission approved unlimited entry of new carriers into the specialized (microwave) common carrier field.

The commission was expected to consider site applications from 33 firms that planned to provide low-cost communications facilities to computer data users.



LETTERS

Privacy and the NRIS

In recent weeks, *Computerworld* and other national publications have carried sweeping criticisms in their news columns and editorial pages of the National Recipient Information System (NRIS) proposed by the Reagan Administration to ferret out welfare fraud by creating a data bank of persons receiving public assistance.

As former chairman of the U.S. Privacy Protection Commission that had spent two years in extensive and intensive investigations of the issues involved, I believe I would be remiss if I did not comment on this proposal in order to help put the issue in perspective.

In dealing with issues of personal privacy in a social welfare age, we must seek to strike an appropriate balance between the needs of our institutions in government and business and the personal privacy rights of the individual. In my judgment, it is entirely appropriate for government to institute a national recipient information system in order to more effectively manage the massive disbursement of funds for welfare purposes.

The fact that we might have such a system does not mean there will be abuses, as long as adequate protective provisions are built into the basic legislation. The kinds of protective provisions, or fair information practices, that I refer to are spelled out in detail in our 654-page report, "Personal Privacy in an Information Society." They include the requirement that only relevant personal information needed to make a decision be collected; that information be used only for those purposes for which it was collected; that none of the personal data be transferred to others without the permission of the subjects themselves; and that the data be destroyed after it has served its purposes.

Unquestionably, "eternal vigi-

lance" is necessary to protect the freedoms of us all, but overzealousness in opposing reasonable management policies can destroy the foundations of our democracy.

David F. Linowes
Professor of Political Economy
and Public Policy

University of Illinois
Urbana, Ill.

On Operations Staffers

"Operations Staffers Decry Management Slights" [CW, April 20] was very appropriate in our computer industry today. Each item addressed is very true and is in much need of additional print and expansion.

We can have the best "bus" money can buy with the highest grade of fuel in the tank and the most efficient mechanic for repairs, but if the driver of the bus is not adequately trained to drive professionally and to react as an expert, and if he is not properly paid for this professional job, the bus is not going to arrive at the proper destination as scheduled.

Our fast upgrading world of computers is demanding that the people who run them be technical and professional in the daily tasks of operation and management pertaining to this function.

Thanks for the coverage; we sure could use more.

Johnny A. Tomison
Operations Manager
Texas Employment Commission
Austin, Texas

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, *Computerworld*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

SOFTLINE/Werner L. Frank

Are Software Costs Running Rampant?

The trade press continues to provide a mixture of views concerning software's current and future cost impact on data processing expenditures.

The most prevalent theme is the notion that software costs are continually increasing, while hardware costs are going down. This often leads to the conclusion that software costs are destined to become 80% or 90% of total DP expenditure.

Contradicting this position was a recent article in which the author asserted that a number of technology improvements, such as application languages, will stabilize the current insatiable need for programmers and will lead to a tenfold improvement in productivity during the '80s. Supporting this position, another article stated that "conventional programming [costs] of \$10 per line of code can be reduced in 1990 to 5 cents a line by adopting the process of putting software on silicon chips."

What, then, is the situation and what is measured when counting the software and hardware expenditure dollar?

IDC Analysis

We cite the authoritative annual International Data Corp. (IDC) budget analysis for U.S. DP installations. The most recent result of this annual study is presented in the accompanying figure, which gives a history and forecast of DP budget distribution for the period 1971-1981.

We note the remarkable steady state of staff and hardware costs as a per-

centage of total costs, even as the total expenditure is increasing significantly from year to year.

Several conclusions can be reached from this data upon recognizing the influence of inflation during the decade:

(1) Level hardware expenditure, in a period when hardware cost-effectiveness was quadrupling, implies an enormous increase in number of installations, computing gear and computing power.

(2) Level people expenditure, in a period of significant inflation, implies a steadiness, if not a decreasing ratio of people to hardware.

Why the Problems?

Yet we know that there are problems. So what is really happening?

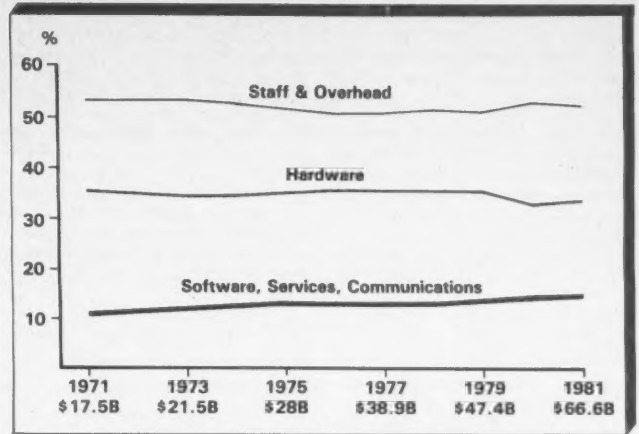
Hardware costs are going down—that is to say, hardware unit costs are decreasing. And as unit price drops, demand increases. This was evidenced when visual display devices became available at less than \$1,000 and the demand for such terminals jumped immensely. Similarly, as storage becomes cheaper, we can expect data-rich applications to become more brazen in their consumption of storage.

Low-cost hardware, therefore, breeds two phenomena:

(1) More hardware is purchased because the entry price makes it possible and economical.

(2) Applications become more complex and resource-consuming.

Hence, the hardware expenditure tends to stay level as these appetites



Distribution of User Budget

IDC Chart

are filled.

This brings us to the software side and the question of estimating this cost.

One definition of software costs is personnel costs plus the cost of purchasing outside labor and off-the-shelf software products. Three observations should be made:

(1) Budgets have a year-to-year inherent limit on expansion. Organizations are prone to limit increases to the 10% to 20% range at the outside.

(2) Because of inflationary wages, there is a limit to real growth in the range of 5% to 10%.

(3) There is a limit on the availability of trained DP personnel.

The impact of all this is that DP staffs grow at best with the growth of the business and, in some cases, even reduce proportionally. This natural limit on personnel growth, coupled with more demand on the staff for evolving more complex software, is somewhat lessened by more purchases of off-the-shelf commercial software and data services. In total, however, the software demand is not satisfied, and rather than increasing the spending for software, we simply are building up bigger backlogs and stretching out the delivery schedules.

But a new trend has emerged with—

(Continued on Page 40)

HUMAN CONNECTION/Jack Stone

Strategy Homes In on Reducing Complexity

At last someone is looking at the total information system operation to define how the organization should change in order to reduce operational complexity. A strategy to do so, termed "systems management architecture" (Sysma), has been developed by a team of computer consultants including Kenneth E. Branch and W.L. Hendershot (Irma Corp., P.O. Box 772, Bartlesville, Okla. 74003). Branch and Hendershot collaborated with Steven A. Epner (User Group, 443 N. New Ballas Road, St. Louis, Mo. 63011), who presented a paper on the subject at the fourth annual meeting of the Independent Computer Consultants Association in Las Vegas last month.

The underlying premise of Sysma is that the key to reducing complexity in today's data processing operation is to define how management and technological processes relate to each other.

Many of today's DP experts have said that the DP department must operate as a business entity—in that the users are provided the same treatment as customers of a quality commercial services organization—if it is to operate successfully during this decade. And this implies that the department must identify and imple-

ment necessary business processes which are not already in place, the paper's authors pointed out.

Toward this end, Sysma defines

"The underlying premise of Sysma is that the key to reducing complexity in today's data processing operation is to define how management and technological processes relate to each other."

eight major business processes which are briefly summarized below (the authors also defined associated sub-processes which are too numerous to note here):

- **Administration:** The processes that maintain accurate records of the business enterprise's resources and how well these resources are being utilized. They include monitoring and reporting to management on the resources' level of capability, along with recommending how to improve these capability levels.

- **Operational production:** The processes that define products or services provided to clients.

- **Development production:** The processes necessary to prepare "tools" to work for the operational production processes.

- **Auditing:** The process used to eval-

uate other processes in their use of business resources to meet the goals and objectives of the business enterprise. Auditing is used to determine

how well the management system is operating within the business enterprise.

- **Planning:** This is a decision-anticipating process and is accomplished before taking action. A DP department, functioning as a business entity, cannot reach its goals without a plan.

- **Marketing:** This is the process of presenting products and services in such a way as to generate a profit for the enterprise while allowing prospective users the choice of spending their money for it.

- **Management:** The reasoning process used by people of authority to handle problems and make decisions.

- **Research and development:** New management tools and techniques must be developed as technology

moves ahead. It is the responsibility of research and development to develop and/or locate these tools and techniques for management.

The authors indicate that these items represent a good set of starting definitions for the processes that ought to be taking place in today's medium- to large-scale DP installations. But to determine the processes that are actually required and how well these processes are currently being performed suggests a study of the DP enterprise. Once the study is complete, the organization should consider developing an implementation plan for initiating or improving processes in order that expectations will be met.

The planning effort may take many months, the authors indicated, and implementation many years because, in effect, it is required to convert the DP department to a stable business enterprise. This is hardly a trivial undertaking. They observed that DP has taken a number of years to evolve to its present stage, and it is not going to change dramatically in a short period of time; the steps to be taken must be thoroughly researched, carefully considered, efficiently planned, simply designed and smoothly implemented.

Toward a Better NCC

I attended the National Computer Conference in Chicago last month and have a suggestion that could make future DP conferences much more profitable and enjoyable.

I had three basic reasons for attending NCC this year. The first was to broaden my knowledge of what is and will be available in the way of hardware. The conference served this function well. The second was to attend the lectures that were given in different areas of DP. I had hoped that this would be the most valuable part of the conference, but I was a little disappointed. The lectures I attended were either too general to be of use or they were specific and technical in an area in which I had little interest.

My third reason for attending is the subject of this letter. I see confer-

ences of this size as a great opportunity for DP professionals to get together and learn from each other. I had hoped to meet some of the managers of software development groups so that I might be able to discuss some of their experiences with them and thereby gain their knowledge. There were other types of people I would like to have talked with also (minicomputer operations managers, networking professionals, programmers, users and so on), but there was no way of meeting these people, except by chance at one of the two sparsely attended cocktail receptions.

My proposal is this: Create a program to facilitate the type of profes-

sional contact I described above. At registration, have those interested in participating in such a program fill out a brief questionnaire which asks for their areas of interest and experience.

With this, you could build a data base to be accessed either interactively at the conference by the participants, or by generating a list of people under each special interest group. With these groups known, informal get-togethers could be scheduled in the evenings at local restaurants or cocktail lounges.

I am sure there is much I can learn from others' experiences, if I am given the opportunity, and I would hope that some of my experiences

would be of value to others.

John J. McLaughlin
Programmer/Analyst
Decision Dynamics, Inc.
Portland, Ore.

Wizards — Part 2

Judy Walden's Reader Commentary [CW, April 27] was the most entertaining and understandable explanation of what a system analyst does that I have read to date. Since our DP division is very small (I am the total staff), there are often misunderstandings as to what exactly I spend my time doing. The April 27 issue was passed around the office and what follows is the response of one of our infrequent users, our secretary, Peggy Englehart:

The Kingdom of Transformation Chapter II

This will relate the story of Lady Miriam, who sends travelers periodically throughout the Kingdom to bring back news and treasures.

The first problem Lady Miriam encounters is locating an available port. Because of Sires and other Ladies of the Court who have a more constant and immediate need of the roads, coordinating her available time with an available port is sometimes very difficult. You see, Lady Miriam is no lady of leisure. There are many demands on her time. Wizards and Ladies are alike in that aspect, and they both answer to the King. (That is not to say that a Wizard may not be a Lady.)

Ah, but occasionally another Lady of the Court is ill, or a Sire has gone a'hunting, and a port is available at the same time that Lady Miriam has some time to spend. Now, Lady Miriam must be sure that the port of exit is available. If other ships/roads are exiting the Kingdom at either Exit "0" or "1," then Lady Miriam must delay her plans again. As can be seen, an opportune time for The Lady to complete her instructions to the travelers and send them on their way is indeed a joyous occasion.

Now the hope is great that the travelers will travel the Kingdom in search of The Lady's news and treasures with no problem. However, the dragons may know that since the last time these travelers have trod the roads, the wizard has made changes, the dragons have found new lairs . . . Those travelers who come more frequently know the lay of the land and have some dragon-sniffing instincts, but these travelers coming now are infrequent and green.

Imagine Lady Miriam's chagrin when, after finally obtaining a port and an exit, sending the travelers on the same trails they have ventured before, with the same maps, her results are foiled! (Dragons love that!) Best of all, when the wizard is out of the Kingdom temporarily. Be it known, there are times when Lady Miriam's travelers return promptly with grand treasures and spicy news, and those are the days when The Lady and The Wizard are seen dancing with the tree nymphs in the misty glen under the giant mushrooms.

(A small change in the cast of characters is necessary for this particular version of "the game": CTK is DEC.)

Kay Bieszczad

F.N. Cuthbert, Inc.
Toledo, Ohio

LETTERS

What's the score on the BTI 8000?



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count structure and fail-soft architecture eliminate any worries about security, control or downtime.

As for reliability, BTI bats near 1000, thanks to service via remote diagnostics. BTI has been using this method for over 10 years, and currently supports over 3000 systems.

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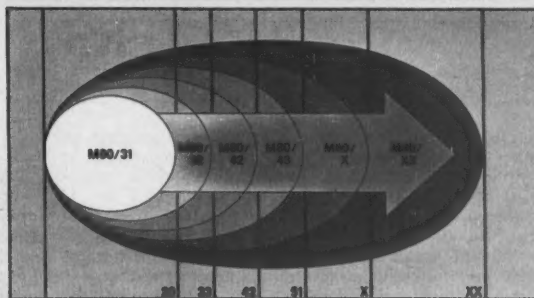
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'Boring Feel'

In the "NCC Grows Up" editorial [May 11], *Computerworld* put its finger on what I view as the main impediment to the practical application of computer technology — "the boring academic feel." Esoteric technical presentations at general industry gatherings amount to little more than an elitist nose-thumbing. I speak of industry meetings in the broad sense, not just NCC.

Academic prattlings are fine in the obstetrics and in-

fant care centers of computer technology. The gibberish is even necessary among those giving birth to and nurturing obscure technical nuances. As any technology matures the challenge becomes one of putting away childish things. A broader emphasis is required to take it to adulthood. How many of us can claim that our problems are really technical?

The failure of program organizers to consider majority needs amazes me in its lack of sensitivity. One has to wonder if the conference planner mentality doesn't make a direct leap from obstetrics to geriatrics.

Peter Kushkowski
Manager, Process Computer Engineering
Northeast Utilities
Hartford, Conn.

LETTERS**Thanks for Boost**

Joe L. Caruthers' recent comment in *Computerworld* under the rubric "Joining In Protest" was a real upper for me. As someone who attempted to gain support for the economic boycott of the National Computer Conference, I find it gratifying to know that there are people like Caruthers who not only

understand what it is like not to be recognized in the Constitution, but also know what must be done to make such recognition a reality.

Thanks for boosting my spirits, Mr. Caruthers.

Shirley C. McCarty
Principal Director
Software Engineering Subdivision
Mission Information Systems Division
The Aerospace Corp.
Los Angeles, Calif.

Sizing Up Cost Picture

(Continued from Page 37)

in many of the larger organizations. The distribution of computing power and the assignment of technical staff to user organizations has seen a relinquishing of some budget control and an exodus of people from the centralized DP organization. The classical expenditure analysis for DP, however, has in the past been equated to the budget of the DP installations only. This, therefore, is no longer valid by itself.

But we would have a great deal of trouble if we were to measure the greater community of DP usage and associated costs. How does one perform the DP audit and what is included? Does one differentiate the developers and facility supporters from the operators of terminals and consumers of information?

In one organization such a study was made and the results made public. It was determined that the central DP expenditures for systems and processing were within the usually expected bounds of 1% to 2% of sales. In addition, the total communications costs were shown to be less than 1% of sales. Further analysis showed that an additional cost of about 16% of sales was expended by the company's "knowledge workers," who perform both manual and automated information processing.

It stands to reason that if a broad definition of DP costs were to include all categories of cost associated with handling information, then indeed it is likely that "software" costs will accelerate and dominate hardware costs.

But in such a liberal interpretation of "software," it doesn't really matter what the relative composition of the pieces is. The only thing that matters is that those using the software, and inadvertently the hardware, are doing a more cost-effective and productive job than if they did without the computer.

Frank is executive vice-president of Informatics, Inc. in Woodland Hills, Calif.

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Financial System Fits System/38

ANDOVER, Mass. — Software International Corp.'s General Ledger and Financial Reporting System is now available for IBM's System/38.

The package is a basic general ledger system that also includes budgeting, allocations and cost reporting capabilities, the vendor said.

It runs on-line in Cobol and includes a variable report writer that enables managers to control the contents, sequence and format of reports, according to Software International.

The General Ledger and Financial Reporting System for IBM's System/38 will cost \$29,500, including on-line capability, full technical support, documentation and installation assistance.

It will be available in August, Software International said from 2 Elm Square, Andover, Mass. 01810.

Planning System Fits Most CPUs

EAST LANSING, Mich. — Mega, a financial planning system from Standard Research, Inc., is now available for most major mainframes and operating systems.

The package will run on the Hewlett-Packard Co. 3000, Prime Computer, Inc. systems, Data General Corp. systems, the IBM System/38 and all IBM OS/MVS systems.

A decision support system, Mega allows the modeling of corporate financial resources by combining financial analysis with an easy-to-use natural language, the vendor said.

Financial procedures supported include net present value, benefit/cost ratio, internal rate of return and several types of amortization and depreciation schedules.

Typical applications include revenue forecasting, corporate investment, depreciation, market analysis, amortization and sinking funds, sales forecasting, research and development planning, cash flow cycle planning and capital budgeting.

Mega is available in four concurrent levels with Mega II licensed for a base price of \$10,000.

The firm can be reached at P.O. Box 151, East Lansing, Mich. 48823.

Vendors Back Univac 1100

•Financial Package Data Base-Oriented

BLUE BELL, Pa. — A data base-oriented financial accounting package for its Series 1100 family of mainframes was announced here by Sperry Univac.

The Univac Financial Accounting System (Unifacs) 1100 is said to be an integrated system consisting of accounts payable, accounts receivable, payroll/personnel and general ledger modules. It reportedly allows for processing of different types of organizations through the use of organizational profile records, which indicate unique processing requirements.

The accounts receivable module provides for expense control from voucher input to final expense distribution, the vendor said. The accounts receivable module allows for control and flexibility in processing cash payments and tracking outstanding receivables; its cash postings facilities reportedly provide for cash projections and historical analysis of customer records.

General Ledger

The general ledger/budgeting portion of the Unifacs 1100 package was designed to support general ledger accounting tasks and budget reporting. It includes provisions for defining, calculating and maintaining multiple budgets and for a user-defined chart of accounts, the vendor said.

The payroll/personnel module handles multiple pay categories, federal and state tax calculations and deduction categories. Also included are personnel data such as an employee's history of salary and jobs held.

Unifacs 1100 operates under the OS 1100 operating system and runs on any Series 1100 computer with a minimum of 131K bytes of memory for the Unifacs 1100 program, a printer, card reader and two disk units.

The package will be available this month for a license fee of \$300/mo each for the accounts payable and accounts receivable systems. General ledger/budgeting and payroll/personnel are priced at \$500/mo each.

The vendor can be reached at P.O. Box 500, Blue Bell, Pa. 19424.

•'G/L Plus' Extended To Run on 1100s

NEEDHAM HEIGHTS, Mass. — McCormack & Dodge Corp. has extended its G/L Plus general ledger/financial analysis system software package to Sperry Univac's Series 1100 mainframes.

Written in ANS Cobol, the G/L Plus system also is compatible with IBM 360, 370, 30 series, 4300 and System/34; Burroughs Corp. medium- and large-scale CPUs; the Honeywell, Inc. Level 62, 64 and 66; the Hewlett-Packard Co. 3000; and Prime Computer, Inc. 250 through 750 equipment, the vendor said.

G/L Plus reportedly includes source programs with implementation instructions, documentation, training and on-site support.

The package varies in price from \$25,000 to \$51,500, depending upon the hardware configuration. It is available on the Univac 1100 series for \$51,500.

McCormack & Dodge is located at 560 Hillside Ave., Needham Heights, Mass. 02194.

•QLP Now Handles Non-DBMS Files

ROSEVILLE, Minn. — Users of Sperry Univac's Series 1100 Query Language Processor (QLP 1100) now can access non-data base management system files, the vendor announced here.

QLP 1100 processing formerly was limited to support of Series 1100 data base structures. Its query/update capability and application development facility now are available to users of standard files, according to the vendor.

The new QLP 1100 release, Level 4R1, includes extensions to on-line query capabilities and a multiple report generation feature that reportedly allows any number of different reports to be processed during one pass of a DMS 1100 data base or traditional file.

The QLP 1100 software is available on all Series 1100 processors and with the standard file interface is priced at \$446/mo.

Univac can be reached at P.O. Box 500, Blue Bell, Pa. 19424.

IBM DOS USERS DOSSIER DOES IT AGAIN

"DOSSIER has a super ability to detect changed programs—even changes as small as one byte."



Patrick Eiting, Systems Software Senior Analyst, Fort Wayne National Bank
Patrick Eiting knows all about program changes. When he began his career in data processing 12 years ago, he was the one who had to keep track of those changes. Now DOSSIER does it for him.

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Nova, Micronova Gain Text Editing Package

HICKORY, N.C. — Editing software written for Data General Corp. Nova and Micronova processors has been introduced by Carolina Business Computers, Inc., which said the package is the only software written for DG's Extended Basic to run under the vendor's disk operating system and RDOS.

Wordtrek may be run simultaneously along with other Basic programs, eliminating the need to suspend operations under Basic, according to a Carolina Business spokesman.

Wordtrek's editor allows creation and modification of the document in a variety of ways. Provisions are made for specifying the type of data, whether it is alphanumeric, a reversed name, a dollar or integer amount or a date.

A special group of print control

functions are used to specify a new page and right justification on or off within the document, the spokesman said.

Output Control

The print parameters/print programs control the hard-copy output of the document and an operator-selected option is included in which up to 10 lines of criteria may be input. This is matched against the FMS record to determine whether the record will be included in the print run.

Users may also do arithmetic operations within the body of the document using Wordtrek.

Wordtrek costs \$750 for a single-CPU license and is available from authorized dealers or directly from Carolina Business Computers at Oakwood Center, 350 Third Ave., N.W., Hickory, N.C. 28601.

File Transmission Program Links DG Computers

BATON ROUGE, La. — Software that reportedly allows programs, data files and command line interpreter commands to be sent, received and executed between any two Data General Corp. computers using a pair of \$150 asynchronous modems was unveiled here by Data Systems of Baton Rouge, Inc.

The program, Blocked Asynchronous Transmission (Blast), runs under DG's RDOS and disk operating systems and can simultaneously transmit and receive data files, programs and commands.

Existing programs and data files reportedly can be transferred from remote systems, providing diagnostic capabilities and reducing communications costs via use of standard dial-up phones instead of synchronous techniques or the mailing of disks and tapes.

Blast is said to support both disk- and diskette-based systems and a variety of multiline and single-line

asynchronous interfaces. Operation under disk operating system and RDOS provides adaptability to the variety of DG hardware configurations available and allows either foreground or background execution with another activity running concurrently in the alternate ground, the vendor said.

Minimal Configuration

The small amount of core memory required by the program allows use on minimal hardware configurations, according to Data Systems.

Speeds to 9,600 bit/sec through universal line multiplexers, asynchronous line multiplexers and single-line asynchronous interfaces are said to be supported.

Blast is priced at \$1,200 for an initial license with a royalty of 10% per installation, the vendor said from 8939 Jefferson Highway, Baton Rouge, La. 70809.

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DEC Text Management System Supports Gigi Graphics Terminals

MARLBORO, Mass. — Digital Equipment Corp. announced the release of a software system for computerized text creation and management.

Called Scribe, the system reportedly supports DEC's Gigi color graphics terminal and is designed for use with the vendor's VAX-11 and Decsystem-20 computer systems.

It is designed to assist in the preparation of books, conference proceedings, professional articles and presentations and technical documentation.

Scribe permits inclusion of graphics illustrations with text developed at a Gigi terminal; automatically numbers figures and tables; and gener-

ates tables of contents, lists of figures and tables and running page headers and numbers, the vendor said.

Citation Facility

It includes a bibliography and source citation facility, footnote and endnote placement capability and an automatic-search hyphenation table. In addition to Gigi, Scribe is said to support line printers, letter-quality printers, phototypesetting systems and laser printers.

Single-user licenses for Scribe, with documentation, are available for fees of \$10,000 for educational institutions and \$25,000 for noneducational organizations. Licenses for additional systems at the same site, without documentation, are \$2,000 and \$5,000 respectively.

Deliveries are scheduled to begin in June and maintenance services can be obtained directly from Unilogic, Ltd., DEC said from 146 Main St., Maynard, Mass. 01754.

Fastdraw/3 Runs on VAX

ST. LOUIS, Mo. — McDonnell Douglas Automation Co. (McAuto) has made available Fastdraw/3 as a licensed system on the Digital Equipment Corp. VAX-11/780 computer.

An interactive finite element modeling graphics system, Fastdraw/3 previously has been available only as a time-sharing service through McAuto's teleprocessing network.

Fastdraw/3 is available through either a paid-up license or a monthly license. A paid-up license for the entire system (preprocessing, mesh generation, postprocessing and plot file display/edit) costs \$35,000 with a monthly maintenance charge.

A monthly license for the entire system is \$12,000 a month, according to the firm, which is headquartered in St. Louis, Mo. 63166.

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Tool Debugs DEC Fortran

LAKE HIAWATHA, N.J. — The Fortran Debugging Tool (FDT), designed for on-line interactive use by Fortran programmers working on Digital Equipment Corp. PDP-11 processors, was introduced here by Total Data Systems, Inc.

FDT is included at task-build time and reportedly does not require assembly language or systems knowledge.

Program execution with FDT can be done one Fortran statement at a time (single-step mode) or can proceed to predefined statement numbers (breakpoint), the vendor said.

Other Features

Other features include variable examination and modification, a variable trace trap, variable format control, Ascii format control and exit. FDT also is said to function concurrently with ODT, DEC's Macro-11 debugging tool.

FDT currently is available for Fortran IV Plus under RSX-11M and IAS/RSX-11D operating systems. It uses 3K words of memory, the vendor said, adding that a more limited version is available for Fortran under the RT-11 operating system.

A normal binary release of FDT carries a one-time fee of \$5,000, which includes one-year maintenance and any updates. A source release is available for \$10,000 that also includes the right to copy FDT, the vendor said from 87 Hiawatha Blvd., Lake Hiawatha, N.J. 07034.

LDA Utility Introduced For System/34

ORONO, Maine — A utility program for IBM System/34 users, LDAMGR from Futurenow Software, Inc., is said to accept data from an operator and to place it in the local data area (LDA), which is a 256-byte record associated with each workstation.

Programs or procedures that run after LDAMGR reportedly can use the data in the LDA, even if they run detached from the workstation.

The package is parameter driven by control statements in the procedure.

Each control statement specifies one of 27 field types, where to place the data in the LDA and a one-line prompt to be displayed at the time the data is to be entered.

LDAMGR is available in RPG-II source code on a single-density diskette for a one-time charge of \$150 from Futurenow at 76 Smith St., Bangor, Maine 04401.

'Ingres' Acquires Fortran, Pascal Links

BERKELEY, Calif. — Relational Technology, Inc. (RTI) announced high-level Fortran and Pascal interfaces for the Interactive Graphics and Retrieval System (Ingres), a relational data base system for Digital Equipment Corp. VAX computers running under VMS.

Using the Embedded Query Language (Equel), as the interface is called, an Ingres user can embed Ingres que-

ries directly into programs written in C, Fortran and Pascal, the vendor said.

Equel is reportedly identical to the Ingres Query Language (Quel), and a user familiar with this system does not need to learn any new concepts to access an Ingres data base from a procedural language, RTI claimed.

Equel handles low-level processing associated with query statements, including

loop control, data conversion and error reporting, according to the vendor. Equel statements may be tested before being embedded into the procedural language.

Since Equel is the same for all languages, the vendor said statements used in C, Fortran and Pascal programs are interchangeable. The interface presented to the user is said to be independent of the actual implementation of

the interface to Ingres, assuring that major conversion efforts will be unnecessary to maintain compatibility with future versions of Equel, Quel or Ingres.

The new version of Equel is part of the standard Ingres license and is being distributed without charge to all current RTI Ingres users, the vendor said from 2212 Eunice St., Berkeley, Calif. 94709.



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Tape Library System

'CA-Dynam/T' Fits OS, OS/VS

JERICHO, N.Y. — Computer Associates, Inc. announced a version of its tape library control system, CA-Dynam/T for OS and OS/VS users.

CA-Dynam/T OS is said to be functionally compatible with the DOS, DOS/VS and DOS/VSE version. It reportedly will provide the OS user with the full complement of features and facilities available under the DOS version, including catalog management, audit trail and report generation.

Under DOS, all members of

the CA-Dynam/T family currently share a common catalog and the new OS version of the system also will interact with this catalog, the vendor said.

The backup/restore feature and other support programs associated with the catalog are available with the new version, according to CA. Updating of the catalog with full current details of all data sets, as well as associated control information, is also handled automatically, the vendor said.

CA-Dynam/T OS includes

an audit trail facility that logs all tape data set activity onto an audit file. This can then be analyzed using a report generation facility.

The package also includes generation and retention control of data sets, including support for unlimited numbers of versions and volume serial numbers, the vendor claimed. Other features include support for recording density, period-ending data and tape length, scratch pools, work data set, active master data sets and a lock facility.

CA-Dynam/T OS is available on a three-year lease license at \$10,000, with other lease plans available, the vendor said from 125 Jericho Tnpk., Jericho, N.Y. 11753.

Financial Tool Uses System/34 Interactively

WALTHAM, Mass. — Mass Systems Co. has announced a package said to enable a financial officer to use an IBM System/34 terminal in an interactive mode to get answers to questions ordinarily requiring the use of handbooks and tables.

Financial Desk Calculator supports functions including simple and compound-interest calculations, bond yield and pricing, mortgage amortization and present value of future streams, the vendor said.

Financial Desk Calculator is priced at \$250 and is available from Mass Systems Co., 28 Edgehill Road, Waltham, Mass. 02154.

'VID' Designed For Ascii Units

VAIL, Colo. — A CRT terminal-oriented editor reportedly designed for inexpensive Ascii terminals and an enhanced version of a relational data base manager were announced here by DTSS, Inc.

Video Editor (VID) was designed to edit text and documents over standard dial-up phone connections to the DTSS Interactive Computing System.

DTSS also claimed improvements in the cost and speed of Datasys, its relational and hierarchical data base management system.

VID and Datasys may be licensed for use with the DTSS operating system. VID may be leased for \$150/mo and Datasys is available for \$1,150/mo.

They also may be accessed through the DTSS Interactive Computing System, the vendor said from 10 Allen St., Hanover, N.H. 03755.

'Jars' Update Requires 30% Less CPU Time

McLEAN, Va. — Johnson Systems, Inc.'s latest enhancement to its OS Job Accounting Report System (Jars) is said to increase runtime efficiency, add flexibility and respond to industry shifts in reporting requirements.

Release 4.0 is said to require up to 30% less CPU time through more efficient report generation logic and reportedly supports MVS-SMF System Extension, Release 2.0. The release also features enhanced report writer capabilities as well as global control cards and control card edits.

OS Jars costs \$8,000 until July 1, when the price will go up to \$10,000, Johnson said from 7923 Jones Branch Drive, McLean, Va. 22102.

Lexis, Nexis Get Access To Lockheed's Dialog

PALO ALTO, Calif. — Lockheed Missiles & Space Co.'s Dialog Information Retrieval Service has entered into an agreement with Mead Data Central (MDC) under which subscribers to MDC's Lexis and Nexis services will be able to gain access to the Dialog system through their MDC terminals.

The more than 120 data bases on the Dialog system include several of special interest to the legal community, such as the *Legal Resource Index*, which indexes more than 660 law journals and five law newspapers; the

Congressional Information Service Index, which provides access to public policy studies, hearings and reports of the U.S. Congress; and the *Federal Index*, which provides selective information on a number of federal government activities.

MDC's Lexis system is a computer-assisted full-text legal and accounting system and Nexis provides access to the full text of general and business news.

More information can be obtained from Dialog Marketing, Lockheed Information Systems, 3460 Hillview Ave., Palo Alto, Calif. 94304.

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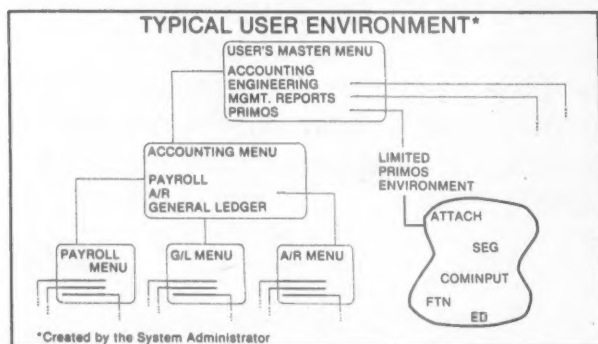
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Language Processors Unveils Compiler Family

BELMONT, Mass. — Language Processors, Inc. has introduced a family of machine-independent compilers that includes an Ansi-74 Low-Intermediate-Level Cobol, Ansi-74 High-Intermediate-Level Cobol, Draft Ansi Pascal, Ansi-78 Fortran, Ansi Full PL/I, Ansi Subset-G PL/I and IBM System/3-Compatible RPG-II.

The compilers share a common optimizer and allow a common code generator. All phases of the compilers except the code generator are machine-independent, LPI said.

The family will compile on a host computer that supports 16-bit or larger integers and provides 64K bytes or more of directly addressable memory available to the compilers. The entire family is written in Ansi Subset-G PL/I.

A Prototype Code Generator is available, which LPI said reduces the task of writing a code generator for a target machine to implementing code generation algorithms for the target machine using the descriptions in the Prototype Code Generator, debugging and tuning the code generator and implementing special cases if required by the target machine.

The prices for the compilers range from \$50,000 (Pascal) to \$190,000 (Full PL/I), with High-Intermediate Cobol priced at \$115,000. The Prototype Code Generator costs \$20,000.

Prices include documentation on internals of the compilers and a one-year maintenance warranty, LPI said from 254 Trapelo Road, Belmont, Mass. 02178.

Processor-Independent Compiler Designed for New Language

SPRING VALLEY, Minn. — A processor-independent compiler and run-time library for a new programming language said to be a superset of the Backus Normal Form notation has been announced by MRD Systems, Inc.

The PL/C language was implemented to boost productivity of users involved in the development of such programs as computer programming language compilers, human language translators, programming language converters and machine language translators and disassemblers, the vendor said.

The PL/C Language Compiler features rapid implementation of syntactical analysis algorithms, fast code generation, a facility for in-line user assembler language code and facilities for control of collection, symbol table entry and lookup, the vendor said.

The PL/C Compiler and Runtime Library are priced a \$1,000 for the off-the-shelf versions of the object code and user documentation, \$5,000 for the source code and \$6,000 and up for custom implementations from MRD Systems, Inc., P.O. Box 147, Spring Valley, Minn. 55975.

Utilities Run on HP Desktops

MOUNT HOLLY, N.J. — System-level utility programs said to improve the program editing capabilities

and provide new features for the Hewlett-Packard Co. 9845B/C and 9835A desktop computers has been announced by Structured Software Systems, Inc.

Tool Handles Student Loans

LEXINGTON, Mass. — A software package for financial institutions that provides control over student loans and assists in responding to government regulations is being introduced by McCracken Computer, Inc.

The McCracken Student Loan Servicing package controls and consolidates up to 15 individual loan records per student with access to the preceding 12 months of transaction history. Five status categories are maintained for each loan, the vendor said.

The self-prompting package provides a daily calendar of actions needed for each account and a user-defined exception list of error conditions. Producing daily recaps for up to 100 terminals and up to 50 operators, the IBM System/34- and System/38-compatible software pools debit/credit data for posting to the vendor's General Ledger system or can output a paper voucher instead.

The package starts at \$12,500, depending on options, from the firm at Two Militia Drive, Lexington, Mass. 02173.

The programs include Symbol Finder, which provides a program-global search command to find all occurrences of a single identifier; Search and Replace, which locates all occurrences of an identifier and changes name; as well as Cross Reference, Memory Mapper and Dump Alpha, the company said.

Priced from \$150 to \$300, the utility programs are available from stock from Structured Software Systems, Inc., Box 1072, Irick Road, Mount Holly, N.J. 08060.

Collection Agencies Get Debtor Package

BOHEMIA, N.Y. — A series of software packages said to provide collection agencies with debtor accounting has been announced by Sytronic, Inc.

Written in RPG-III, the packages allow collection agencies to receive notices from clients that a debtor has not paid a bill, processing the debtor into the system so that the agency may then inform clients as to the status of accounts, the vendor said.

The packages carry a one-time user fee of \$5,000, including use of source programs and documentation, from Sytronic, 140 Wilbur Place, Bohemia, N.Y. 11716.

Installed by Texas Bank

Front-End Unit Ties Terminals, CPU

Special to CW
SAN ANTONIO, Texas — A front-end communications concentrator, recently installed at a financial institution here, is available from Argos Computer Systems of New York to connect many different terminals to an IBM mainframe under CICS, Tcam, Btam or similar software.

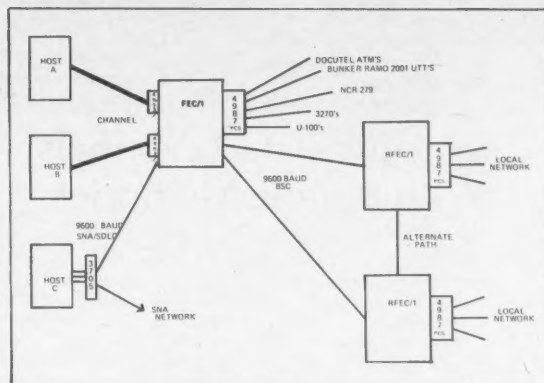
Based on IBM's Series/1 mini-computer, the Front-End Concentrator/1 system (FEC) is "particularly useful in banking and financial applications where large terminal networks already in place must communicate with a mainframe running application software," an Argos spokesman maintained.

"FEC/1 separates the problem of running the network from that of running the application," he said.

FDS Texas needed a high-capability front-end when the company replaced its Univac mainframe with an IBM 370/158 in 1978. The San Antonio financial institution already had a terminal network that employed protocols foreign to the IBM mainframe, so an IBM System/7 was installed to serve as the front-end.

"However, we grew much faster than we expected," James Aston, FDS Texas president, observed, "from less than 200 terminals on the network to more than 500 today. We needed a front-end that could handle a large and rapidly growing network, and I was always fascinated with the idea of using a small computer to take the communications load off the host."

Argos wound up delivering the solution — a system now available commercially for \$140,000, including software. The New York systems integrator's FEC/1 — with its Series/1 hardware — now serves most of the Texas user's 500-terminal



The FEC/1 System

network, which includes Bunker-Ramo Corp. 2001 teller terminals, Hazeltine Corp. general-purpose CRT terminals and Docutel Corp. automated teller machines.

Wideband Facilities Eliminated

Timeplex Adds Inverse Multiplexer

ROCHELLE PARK, N.J. — An inverse multiplexer that provides full-duplex data communications at rates up to 19.2K bit/sec over two independent analog or digital channels, each operating at 9,600 bit/sec, is available from Timeplex, Inc.

By splitting the high-speed input into two channels, the Lineplexer II eliminates the need for expensive wideband facilities, the vendor said. Diverse routing allows the system to be configured for maximum dependability, it noted.

Diagnostic Features

The Lineplexer II offers diagnostics including local and remote loopbacks — switch-selectable from the front panel — and an integral test pattern generator.

Other features include automatic and manual rate adjustment for line degradation, auto-

matic compensation for path delay difference, day and night reconfiguration and automatic or manual training sequence, the vendor said.

An interface adapter allows the unit to connect to Bell Sys-

tem 303 as well as RS-232 devices.

The Lineplexer II inverse multiplexer costs \$5,200, Timeplex said from One Communications Plaza, Rochelle Park, N.J. 07662.

Burroughs, NCR Terminals Supported on IBM CPUs

LONGWOOD, Fla. — A protocol converter said to allow support of Burroughs Corp. and NCR Corp. terminals on IBM host computers has been announced by Systems Solutions, Inc.

The microprocessor-based MC-80 communicates with IBM host software as a 3270 series control unit at speeds up to 19.2 bit/sec and supports up to 16 Burroughs TT102 teller machines or 13 NCR 279s, the vendor

said.

A modem-sharing device allows the converter to connect directly to another converter or to any 3270-type controller, the company claimed.

The converter also eliminates the asynchronous data line and modem while improving teller response time, the vendor said.

The MC-80 is priced at \$2,295 from Systems Solutions, Inc., P.O. Box 3336, Longwood, Fla. 32750.

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MIAMI — A device designed to prevent unauthorized access to computer information by enciphering and deciphering data at rates up to 9,600 bit/sec is available from Racal-Milgo, Inc.

The Datacryptor II uses protocol-transparent technology and operates without regard to communications discipline or methodology, a spokesman claimed.

Units used to encrypt the aggregate of a multiplexer may also be used on low-speed, asynchronous dial-up lines.

The product costs \$2,350 for master site units and \$2,100 for remotes.

Racal-Milgo is located at 8600 N.W. 41 St., Miami, Fla. 33166.

Controller Links Codex Modems To IBM Retail Store System

MANSFIELD, Mass. — Codex Corp. has announced a loop controller said to allow users to connect company modems to the IBM Retail Store System and designed to

interface with IBM data communications equipment.

The LC 3650 converts output from Codex products to an IBM-compatible signal, while featuring built-in di-

agnostics and Auto-Shunt capabilities, the company said.

The company also announced a 4,800 bit/sec modem said to combine the capability for both dial and leased-line operation in a single unit.

The 5208R features an integral RJ-11C interface and microprocessor-controlled automatic adaptive equalization and a compromise equalizer for greater error-free throughput, the vendor claimed.

Also announced was a line of statistical multiplexers said to allow several dumb asynchronous terminals in up to eight locations to share a single four-wire leased line, reducing line and modem costs.

The 670 series was designed for applications where a number of terminals, each with low computing requirements, must share a central computer from many remote locations, the vendor said.

The LC 3650 controller is priced at \$550, the 5208R modem at \$2,450 and the 670 series multiplexers from \$2,150 to \$5,300 from Codex Corp., 20 Cabot Blvd., Mansfield, Mass. 02048.

TI Adds Data Terminals With Bubble Memories

DALLAS — Two bubble memory data terminals said to provide a method of accessing distributed data entry networks while offering the benefits of local, nonvolatile memory have been announced by Texas Instru-

ments, Inc.

The Silent 700 Models 767 and 769 were designed with IBM 3780 protocol and data entry validation to serve markets requiring error-checking capabilities and intelligent data entry functions, the vendor said.

The 769 features a standard synchronous/asynchronous communications port plus a Bell System 113-type acoustic coupler, the company claimed.

The desktop 767 can utilize either the teletypewriter interactive or 3780 batch capabilities through its standard RS-232C communications port, the vendor said.

The 767 is priced at \$3,995 and the 769 at \$4,295 from Texas Instruments, Inc., P.O. Box 202145 H-576, Dallas, Texas 75220.

Tek-Com Unveils Unit

SAN JOSE, Calif. — A modem featuring originate, answer, auto-answer and half- and full-duplex operating modes has been announced by Tek-Com, Inc.

The TC4007 0- to 300 bit/sec asynchronous modem is Bell System 113B-, 103J- and 103A2-compatible and can be used on the dial network, the vendor said. It also features automatic redial, remote and local loop test, field programmable auto-dial and RS-232C and 20mA-current loop interfaces, the company claimed.

The TC4007 is priced at \$295 from Tek-Com, Inc., 2142 Paragon Drive, San Jose, Calif. 95131.

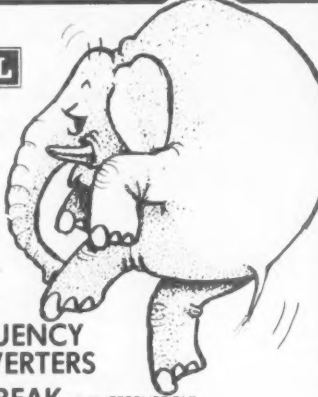
Lear Siegler Updates ADM31

ANAHEIM, Calif. — Lear Siegler, Inc. announced it has enhanced its ADM 31 Intermediate Terminal with features of high-end smart terminals without a price increase.

The new capabilities include programmable function keys, a 25th line for terminal status, smooth scroll, X-On and X-Off and a horizontal split screen. The numeric keypad can be transformed into a set of programmable function keys to enable the operator to send a string of characters to the host with a single key-stroke. The smooth-scroll feature improves the readability of data being scrolled on the screen, according to the vendor.

Other standard features include two full 1,920-char. pages of memory, block-mode operation, editing capability and function keys.

The unit costs \$1,450 from Lear Siegler's Data Products Division, 714 N. Brookhurst, Anaheim, Calif. 92803.



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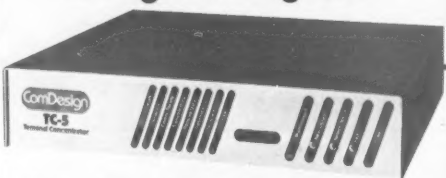
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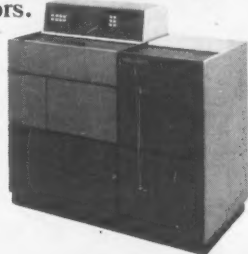
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Multipurpose Workstation

Geisco Updates Marklink Intelligent Unit

ROCKVILLE, Md. — General Electric Information Services Co. has added a variety of capabilities to its remote terminals, enabling its Marklink intelligent terminal to function as a multipurpose workstation alternative to nonintelligent CRT, teleprinter and other terminals, the company said.

The capabilities reportedly permit asynchronous teleprinter interface for sending and receiving data from

a Marklink terminal on other terminals or teleprinters, CRT terminals and hand-held data collection devices.

In addition, the terminal can communicate with compatible equipment through auto-call units to collect, edit and consolidate data that can then be automatically transmitted to GE Information Service host computers, the firm said.

Also, a new teleprinter emulator reportedly

allows the terminals to communicate interactively with other computer services of in-house systems so that a terminal and one of its workstations may be used for time-sharing with host computers, those of GE Information Services or the customer.

The upgraded Marklink terminal is also compatible with both the customers' in-house IBM computer systems and GE Information Services Mark 3000 service, the company's IBM remote batch processing system, the firm said.

The costs for the enhancements vary according to installation needs and the amount of usage. The vendor can be reached at 401 N. Washington St., Rockville, Md. 20850.

PE Family Gets Addition

NORWALK, Conn. — The Model 3600 Data Station, a microprocessor-based, programmable CRT terminal with dual, double-sided, micro-floppy disk drives for mass storage and data retrieval, is the most recent addition to the Perkin-Elmer Corp. family of Intelligent Data Stations.

The Model 3600 provides the user with 48K bytes of random-access memory and 320K bytes of disk storage.

Turnkey software is available for PE Atomic and Infrared Spectroscopy, Thermal Analysis, Elemental Analysis and similar topics, the vendor said. The Petos Basic, an enhanced version of Basic, can also be used with the Model 3600 Work Station. The graphics display feature, when coupled with Petos Basic program-mability, provides the user with Basic-callable graphics subroutines.

The unit costs \$7,900 from the firm at Main Ave., Mail Station 12, Norwalk, Conn. 06856.

CDI Begins Miniterm Series

BURLINGTON, Mass. — A 1,200 bit/sec portable terminal with a 160 char./sec bidirectional thermal printer has been introduced by Computer Devices, Inc. (CDI) as the first of its Miniterm 2000 series.

The Miniterm 2300 features six user-definable soft function keys, battery-protected random-access memory, 80- or 132-col printing, a simplified command mode to set terminal configurations, a switch selectable 300- to 1,200 bit/sec communications feature and uppercase and lowercase printing with descenders.

A throughput printing speed of 120 char./sec is achieved in full-duplex, 1,200 bit/sec operating environments, compatible with Vadic Corp. 3400 modems, CDI said.

The portable terminal utilizes a thin-film technology printhead with vertical dot row printing. Under control of the Miniterm's command mode, the keyboard, printer, communications, function keys and self-diagnostics functions can all be configured through menu-driven software control, according to the vendor.

In addition to the four acoustic transmission speeds from 110- to 1,200 bit/sec with switch-selectable compatibility with both Bell 103 and Vadic 3400 modems, there are eight selectable hard-wire speeds ranging from 110- to 9,600 bit/sec through the standard RS-232C connection.

The Miniterm Model 2300 is priced at \$2,785 and leases for \$240/mo on a one-year lease. CDI is located at 25 North Ave., Burlington, Mass. 01803.

Datatrol Unit Emulates NCR

HUDSON, Mass. — Datatrol, Inc. is offering a teller terminal that it claims can emulate the NCR Corp. 279 terminal through an application program designed for financial institutions using NCR computer systems.

No modifications are required to use the FT-3244, and all transaction procedures are supported through the FT-3244's application program, the firm said. The FT-3244 can reportedly interface with an NCR central system for on-line processing using NCR asynchronous multipoint communications discipline.

The FT-3244, including optional features, costs \$3,680 from Datatrol at Brent Drive, Hudson, Mass. 01749.

Datamedia Terminal VT100-Compatible

PENNSAUKEN, N.J. — An 80- or 132-col, eight-color display terminal, which is compatible with the Digital Equipment Corp. VT100, is available from Datamedia Corp.

The Colorsan 10 features a built-in ruling set and eight colors for both foreground and background information. Other features include split screen, regional scrolling, smooth scrolling and double high and wide characters.

The terminal costs \$3,795, Datamedia said from 7401 Central Highway, Pennsauken, N.J. 08109.

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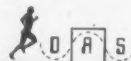
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Bits & Pieces

Xerox Computer Introduces Factory Data Collection System

LOS ANGELES — Xerox Computer Services, Inc. has announced a factory data collection capability for manufacturers. The service uses Epic data terminals connected to a Xerox 1350 information processing system at the customer's site.

The system allows manufacturers to quickly capture complete information on employee time and attendance, work orders and movement of materials, the vendor said.

A basic configuration, including hardware, software, communications lines and maintenance leases for \$3,070/mo, the vendor said from 5310 Beethoven St., Los Angeles, Calif. 90066.

Serial Line Controller Offers Voice Synthesis Capabilities

MOUNTAIN VIEW, Calif. — A second-generation serial line controller said to combine microprocessor intelligence with a voice synthesis capability has been announced by Digital Pathways, Inc.

The SLC-II can automatically dial phone lines and talk by means of an electronically synthesized voice with a vocabulary of more than 300 words, the vendor said. It reportedly operates and connects between any host computer and terminal to monitor messages.

With delivery in 60 days, the SLC-II is priced at \$1,975 from Digital Pathways, Inc., 1260 L'Avenida, Mountain View, Calif. 94943.

Computer-Link Model 1022 Cleans, Inspects Mag Tape

CHATSWORTH, Calif. — A fiber-optic light source for hard disk inspection said to be a companion for disk pack and cartridge cleaners and inspectors has been announced by Data Devices International, Inc.

The Dataoptics disk inspection light source consists of a quartz light source driving a fiber-optic light guide and can be used to inspect any single disk, disk cartridge or disk pack, the company said.

With delivery in 60 days, the Dataoptics disk inspection light source is priced at \$395 from Data Devices International, 20235 Bahama St., Chatsworth, Calif. 91311.

Saved From Scrap Heap, Old Units Can Be Rebuilt

By Tom Henkel
CW Staff

WESTLAKE VILLAGE, Calif. — In this age of spiraling technology and spiraling costs, it is nice to know that you do not necessarily have to toss your old and ailing computer on the electronic scrap heap. In most cases, it can be rebuilt, rebuffed and reprogrammed to keep going forever.

Tymshare, Inc.'s Equipment Support Division, located here, is to computers what body shops are to cars. The division — which is the parent of the data communications-oriented Tymnet, Inc. — runs an electronic junkyard of sorts that contains spare computer parts used to give new life to dying systems.

Users wanting extra disk and tape drives for aging systems can usually find them in Tymshare's inventory. And when hardware that is no longer supported by an OEM breaks down, the firm will either salvage a needed part from a junked system or refurbish the ailing equipment.

"The typical life of a stand-alone computer system is usually five to seven years. In these troubled economic times, the ability to continue using these systems can often be a very cost-effective alternative for dealing with increasing DP costs," according to Frank Dragovits, general manager of the Equipment Support Division.



Tymshare Equipment Support maintains a computer-controlled inventory of more than 20,000 spare parts.

The Equipment Support operation maintains a computer-controlled inventory of more than 20,000 spare parts, Dragovits said. Most of the firm's repairs are done in-house, but engineers have been known to make emergency field repairs.

Tymshare currently has 700 clients nationwide. It also receives additional business from sales of refurbished computer systems.

Expanding Service

At the moment, Tymshare services mostly old Xerox computers, but the firm also services a variety of other computer equipment. Presently, it is trying to establish after-market support for Digital Equipment Corp. systems and peripherals, he said.

Basically, the second life for equipment idea sprang up out of need. Tymshare, better known for its computer services and specialized applications business, started out with 26 Xerox 940 processors as the base of its computer services network.

When Xerox announced it was going out of the computer business, Tymshare administrators decided it could protect its investment by acquiring a group of smaller firms that maintained Xerox processors.

While Tymshare is slowly phasing out its Xerox processors, the idea of refurbishing old parts has remained, and the firm has found there are enough users in the U.S. and in third-world countries to support the effort, according to Dragovits.

Tymshare employs 50 engineers and technicians to provide hardware and refurbishment services. The workers repair fixed-head disk packs, drums, memory boards, printed circuit boards, power supplies, motors and other electromechanical devices.

One utility firm, for example, has an agreement with Tymshare to have at least two disk drums — a precursor to the disk drive — packed and ready for shipment at all times. If one of the firm's existing drums develops a problem, the refurbished one is sent as a replacement and the damaged one is repaired, Hank Strauss, general manager of the firm's operations, said.

However, "It's not like trying to get the last 1,000 miles out of a '67 Chevy," Strauss said, noting most of Tymshare's business comes from firms needing outdated peripherals.

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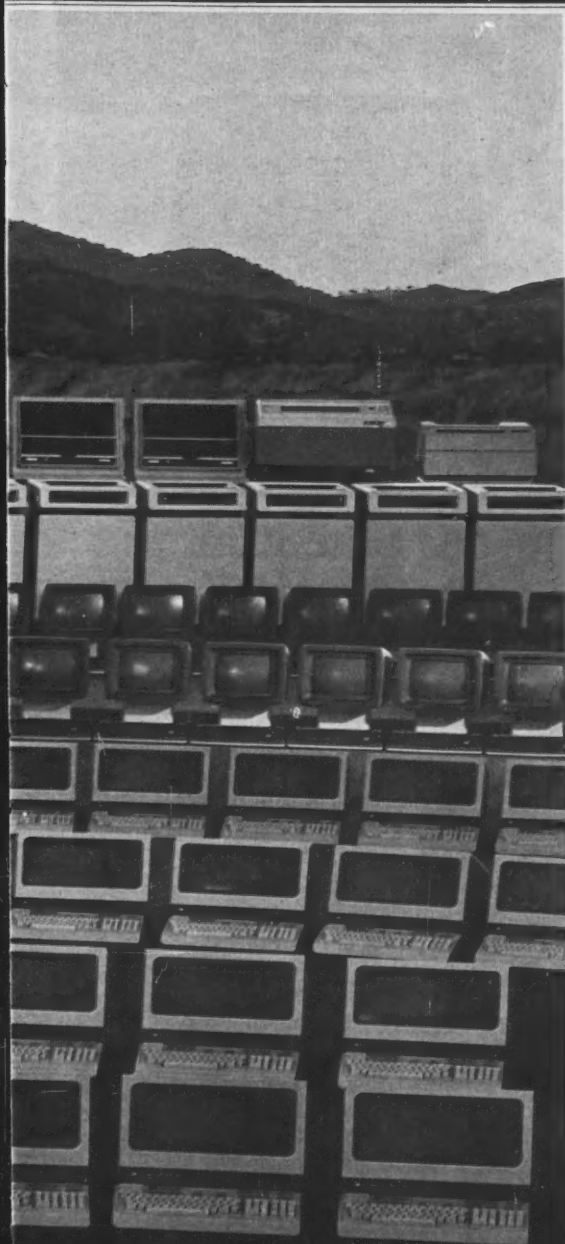
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For Comshare's Commander II Terminal Eases Time-Sharing Use

ANN ARBOR, Mich. — Comshare, Inc. has introduced a data entry terminal that will reportedly allow users of its Commander II time-sharing services to reduce the time, effort and cost of entering, updating and validating new data onto their systems.

Diplomat consists of a CRT terminal, Texas Instruments, Inc. microprocessor and floppy disk drive. As a stand-alone unit, Diplomat allows users to enter and edit their data off-line, store it there until they are finished, then

send it to the main computer. Designed for users with high data entry activity, a customized package of three screen formats is provided for the user's specific needs in a self-prompting format, the firm said.

An instant validation capability immediately edits and rejects incorrect entries, and errors can be checked against the original input document.

A one-time fee costs between \$10,000 to \$13,000 depending on the configuration, plus a \$2,000 one-time software charge. A one-year

lease agreement is also available for \$500 a month plus a \$2,000 charge for the three video display preformatted screen package. Comshare is located at 3001 S. State St., Ann Arbor, Mich. 48106.

Printer Uses Eprom Fonts

SALEM, N.H. — An impact printer that can be programmed to store on internal erasable programmable read-only memory (Eprom) up to seven full character sets simultaneously has been announced by Data Electronic Devices, Inc.

The DE-80SG can generate bar codes for use in food stores with tractor labels, produce an answer-back message so the host computer can see if the printer is on-line and active, and be called individually on a parallel RS-232 or series 20 mA loop, the vendor claimed.

The printer has a 150 char./sec print rate, graphics capability of 960 dot/line, and a built-in self test with repeating alphanumeric.

With a delivery time of 45 days, the DE-80SG is priced at \$995 from Data Electronic Devices, Inc., 18 Bridge St., Salem, N.H. 03079.

Power Island Monitors Usage

ELK GROVE VILLAGE, ILL. — Sola Electric has announced The Power Island, a processor power center that reportedly eliminates the installation and alteration costs of a hard-wired computer room, while offering monitoring features.

The Power Island is a self-contained power distribution system that substitutes flexible cable for conventional hard wiring and conduit layouts. By designating one unit as the "control," remote units can be added to accommodate larger loads.

The unit plugs into a junction box connected to a building's power source. Output distribution cables are then uncoiled and receptacles appropriately located for equipment connection. The power unit is available in load ratings from 15- to 225 kVA, the vendor said.

The unit operates on 480 Vac and steps down output voltage to 120/208 Vac for processor use. It also features a system status panel to monitor both internal and external power conditions for the control system.

Power Island units start at \$8,000, the vendor said from 1717 Busse Road, Elk Grove Village, Ill. 60007.

MSI Unveils Controller, Hand-Held Terminal

COSTA MESA, Calif. — MSI Data Corp. has announced a hand-held data entry terminal and a microprocessor controller receiver that can automatically place telephone calls to unattended remote data entry terminals.

The MSI/84 is a hand-held data entry terminal designed for traveling salesmen. The unit is powered by four penlight batteries and can be used any distance from a central processor. Orders can be transmitted via telephone lines to the host, the vendor said.

The unit employs a liquid crystal display that allows full alphanumeric display. It also comes with a custom-application module that allows the user to change portable program modules for addi-

tional applications, the vendor said. The MSI/84 costs \$650.

The MSI Model 2743 receiver/converter is designed for chain stores or other businesses using large numbers of MSI's portable hand-held data-entry terminals. The unit replaces the MSI/2732 and offers expanded features, including a keyboard and gas plasma display, an automatic calling function, an audit port that enables a printer to be hooked up to the receiver to record communications and system status, the vendor said.

The MSI/2743 costs \$7,000 for an on-line model, \$9,000 for a one-diskette model and \$10,000 for a two-diskette model, the vendor said from 340 Fischer Ave., Costa Mesa, Calif. 92626.

Second Printer Debuts In Infoprinter Series

SANTA ANA, Calif. — The second in a line of serial matrix impact printers intended for small business systems and minicomputers which need up to 180 char./sec print speed and up to 236-col output, with no duty cycle limitations, is being introduced by Infoscrite, Inc.

Designated the Infoscrite 1000, the printer is capable of producing DP quality characters at 10-, 12-, or 16.5 char./in., as well as correspondence-quality characters at 10 char./in., the firm said. The printer may also be operated in a graphics mode so

that each of six printhead wires is independently controlled by the data sources.

A microprocessor incorporated in the printer controls character recognition, printing, printhead positioning and paper movement. The printer stores a standard Ascii 96-char. set in read-only memory (ROM), together with an alternate character set, also in ROM. The printer uses bidirectional printing, with logic seeking.

The Infoscrite 1000 costs \$1,795 from Infoscrite at 2720 S. Croddy Way, Santa Ana, Calif. 92704.

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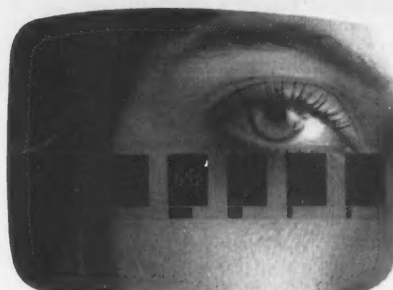
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INFORMATION ENGINEERING

By Clive Finkelstein

Part 4: Data Analysis And Data Base Design

This is the fourth of six articles on information engineering, a planning methodology for developing corporate data models. It is intended for users and management with no computer experience. Information engineering provides formal DP methodologies for data analysis, data base design and synthesis of program specifications.

The articles cover the following topics: (1) information engineering methodologies, (2) developing a corporate data model, (3) information analysis, (4) data analysis and data base design, (5) procedure formation and (6) information engineering development.

Both information analysis and data analysis produce a data model — a logical data structure that represents the data relevant to different management levels. These data models will exhibit similarities (because they address the same organization), but also differences (because they are approached from different management perspectives). The two data models can be combined to produce a consolidated data model. This brings together the information needs of top management with the information needs of operating management — in the one logical data structure.

The use of information analysis and data analysis at different management levels enables a cross-check to be applied to the data model. The

emphasis of data analysis is in identifying the data and processing tasks the organization actually uses.

Information analysis, on the other hand, identifies the data that should be used by the organization, both now and in the future. It then cross-checks that against data from current systems. This ability to quality-test the evolving data model is one of the great strengths of information engineering.

There are two phases in data analysis: data discovery and process verification. Each of these phases has a number of stages, listed below and described in more detail in the following pages:

Data discovery:

- Stage 1: Initial data identification.
- Stage 2: Business rules.
- Stage 3: Initial data model.
- Stage 4: Normalization.
- Stage 5: Third normal form data model.
- Stage 6: Data model quality test.

Process verification:

- Stage 7: Transaction processing.
- Stage 8: Transaction performance.
- Stage 9: System performance quality test.

Stage 1: Initial data identification. One of the first problems encountered in the development of an infor-

mation system is to identify required data. Data analysis provides three alternative approaches for data identification: systems analysis, entity specification and structured analysis.

Systems analysis is based on the traditional analysis technique used by the DP department. This determines the various source documents, reports, inquiries, file formats, manual ledgers and other relevant documentation in the existing system (either manual or automated). From this documentation, the data for subsequent analysis can be identified.

Entity specification is used when it is not possible to identify readily the various source documents, reports, inquiries and other associated documentation used by systems analysis. This is sometimes the case when the area being examined is so large and contains so much apparent "data" that it is difficult to know where to start. Entity specification helps identify that data worthy of further detailed examination. It can be applied by users with no DP experience. This is a key advantage.

Structured analysis is a software engineering technique that graphically documents the existing procedures, both manual and automated, in the area under investigation using a data flow diagram. The data flow diagram identifies data flows (such as docu-

(Continued on In Depth/2)

(Continued from In Depth/1).
ments) and data stores (such as files). These data flows and data stores provide initial identification of data.

Stage 2: Business rules. The term "business rules" refers to a series of descriptive statements that explain the relationships (associations) between data entities. An example will serve to illustrate. The box on In

The business rules identify "things" (such as customers or orders), together with volumes (10,000 customers), frequencies of occurrence (an average of five orders are outstanding at any one time for each customer) and relationships between those things (customers place orders against products).

The business rules are determined by interviewing or directly involving users and management with an intimate knowledge of various areas of the organization. The emphasis is

An empirical approach to identifying possible entities is to examine the various nouns in the business rules. Nouns relate to "things." If data must be stored about something for later reference, it is a possible data entity. "Customer," "order," "product" and "back order" are data entities.

Data relationships, identified from analysis of the business rules, are then added to this data model. These are represented as lines joining the related data entities, with the type of data relationship (one-to-one, one-to-many, many-to-many) represented as shown in Figure 1. The average frequencies of occurrence or a range of frequencies are recorded at the rel-

This data model is used as a basis for walk-throughs with users to identify the data relationships and data entities that may exist in real life and may have been overlooked.

Stage 4: Normalization. We have so far discussed the development of an initial data model, based on analysis of business rules. An alternative approach is based on normalization of data attributes identified in source documents, reports, inquiries, computer file formats and manual ledgers. This provides a means of quality-checking and stabilizing the data model.

We will focus our attention on only two documents of the Widget Imported Products Division to illustrate data element collection and normalization. In practice, many more documents may be used to identify all relevant data attributes. The order form and the invoice documents from the orders and accounts departments are sufficient for our purpose. These forms are illustrated in Figure 2.

By examining these two documents, we can identify a number of separate data attributes. These are recorded as follows:

ORDER: (Order #, order date, date required, customer #, customer name, delivery address, ((product #, product name, quantity ordered))).

INVOICE: (Invoice #, shipment #, invoice date, customer #, customer name, order #, order date, date required, customer address, delivery address, ((product #, product name,

Order#:	Date of Order:	Date required:
Customer#:	Customer Name:	
	Delivery Address:	
Product#	Product Name	Qty Ordered

[illegible]

Figure 2. Relevant Documents for the Imported Products Division,
Used as Input to Normalization

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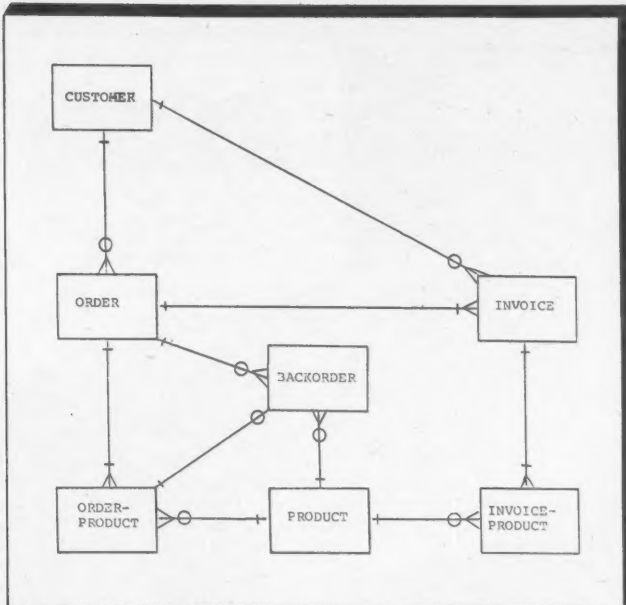


Figure 3. Third Normal Form Data Model, Following Normalization

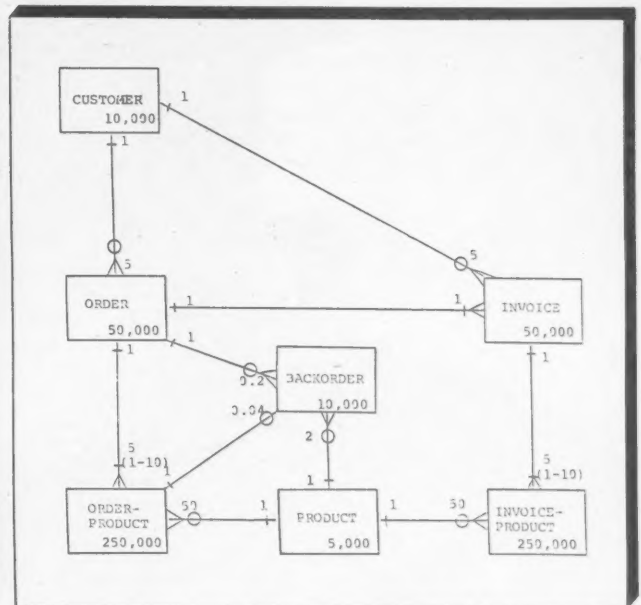


Figure 4. Final Data Model, Following Data Model Quality Test

quantity ordered, quantity this invoice, quantity on back order, unit price, total price)), invoice total).

Notation

ENTITY-NAME: (Primary key #, attribute-1, attribute-2... ((repeating group key #, repeating group attribute-1, ... repeating group attribute-m)), ... foreign key #, foreign key #, ... attribute-n).

We will apply the process of normalization to the entity list, progressing through first normal form to second normal form and then third normal form.

First normal form requires us to identify repeating groups within a data entity and then remove each repeating group from that data entity to form a new data entity. The primary key of this new data entity is generally a compound key formed by concatenating the primary key of the data entity in which the repeating group resided, with the identifying key attributes of the repeating group removed.

Second normal form next requires that we identify and remove the data attributes that were only partially dependent on the primary key of the data entity in which they reside (or on only part of a compound primary key).

Third normal form examines each data attribute in a data entity to determine the attributes that are not dependent on the primary key (single or compound), but are instead dependent on some key attribute other than the primary key.

Following is the third normal form (TNF) entity list. This includes all data attributes initially identified from the order form and the invoice in Figure 2 and documented in entity list format. The TNF entity list also

Sample 'Business Rules'

The Imported Products Division of the Widget Corp. has 10,000 customers who place orders against 5,000 products. An average of five orders are outstanding at any time for each customer, with 20% of these orders having back orders to be filled.

Each order is made up of an aver-

age of five product orders, but this can range from one product order up to 10 product orders making up an order. An average of two invoices are raised to cover two shipments (on average) per order.

Each product has an average of 100 invoice product lines, with two back orders for each product

contains additional data attributes identified by subsequent user involvement or interview during normalization:

ORDER (Order #, order date, date required, delivery address, customer #).

CUSTOMER (Customer #, customer name, customer address, account balance, credit limit).

ORDER-PRODUCT (Order #, product #, quantity ordered).

BACK ORDER (Order #, product #, quantity on back order).

PRODUCT (Product #, product name, unit price, balance on hand, minimum balance, reorder quantity).

INVOICE (Invoice #, invoice date, customer #, order #, invoice total).

INVOICE-PRODUCT (Invoice #, product #, quantity this invoice, total price).

Stage 5: Third normal form data model. A TNF entity list can be represented schematically as a TNF data model. This documents each TNF data entity as a box, with data relationships between entities represented by lines joining those entity boxes.

Data relationships are identified through primary keys, compound

keys and foreign keys. These relationships may be verified by involving or interviewing relevant user personnel. The following illustrates the development of a TNF data model from the TNF entity list.

Each TNF data entity is represented as a rectangular box (see Figure 3).

The TNF data entities with compound keys are examined. The compound key consists of two or more key attributes. If those individual compound key attributes also exist in the primary key of another data entity, a data relationship exists between the data entity in which the key attribute resides as a primary key and the entity in which it resides as part of a compound key. This type of data relationship suggests a possible one-to-many relationship and is so drawn.

When all compound key entities have been examined, attention is directed to entities that contain foreign keys. (A foreign key is defined as a data attribute of one data entity that is also a primary key of another data entity.)

Customer # exists as a foreign key in the ORDER and INVOICE data entities. This indicates a relationship between the CUSTOMER data entity and the ORDER and INVOICE data entities (customer # is the primary

key of the CUSTOMER data entity).

The existence of a foreign key may indicate either a one-to-many data relationship or a one-to-one data relationship. The determination of the degree (one-to-one or one-to-many) of relationships established by foreign keys is generally resolved by user interview. Based on the result of these interviews, the TNF data model is completed.

At this point in data analysis, we have documentation representing data models derived from two different approaches. We have the initial data model derived from the business rules and subsequent interviews of user personnel. We have the TNF data model derived formally from the TNF entity list, based on data attributes identified from relevant documentation.

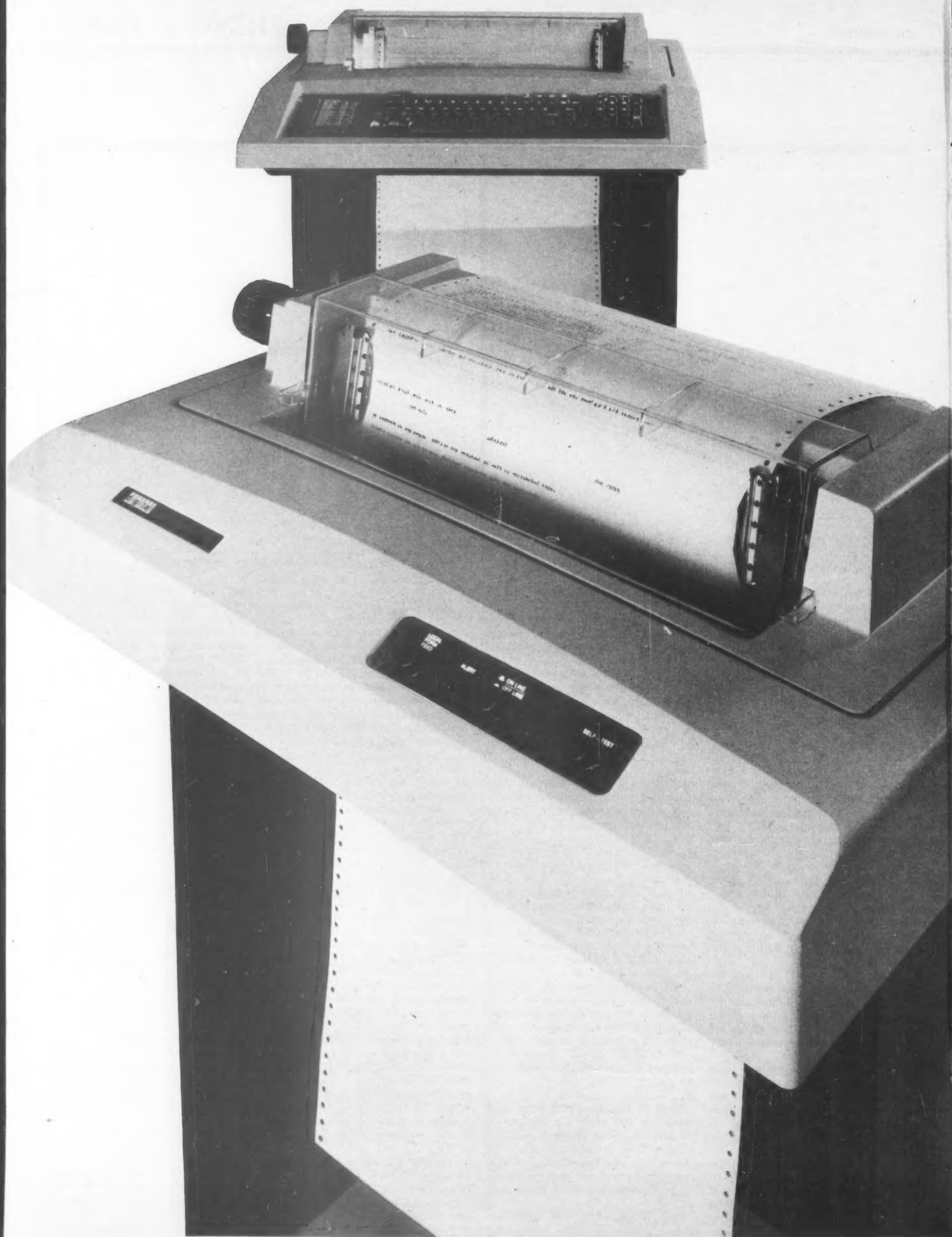
Stage 6: Data model quality test. Our objective at this stage is to identify differences between the two data models (the initial data model and the TNF data model) and resolve the nature of those differences. Differences may exist in the presence of data entities in one model that were not identified in the other model. Similarly, data relationships may have been determined through one approach and not the other.

We welcome such differences, for they offer an opportunity to increase our understanding of the data model. They provide a quality test. We must resolve the reason for those differences.

Was the omission of data entities or data relationships from one model an oversight? Perhaps we did not obtain all relevant information from existing documentation or by interview.

Are those additional data entities or data relationships irrelevant to our

(Continued on In Depth/6)



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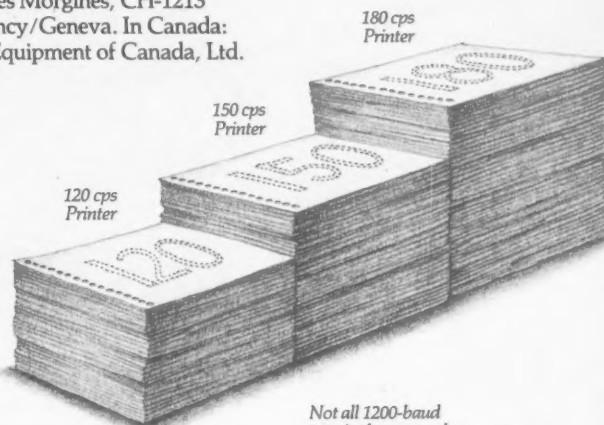
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IN DEPTH

(Continued from In Depth/3)
examination? Was their identification a "red herring"?

Do they represent data that is no longer relevant to the organization? Do they represent data entities or data relationships that will be more significant in the future?

Figure 4 (on In Depth/3) documents the final data model, following resolution of model differences. This quality test has also enabled verification and subsequent correc-

tion of specific entity volumes and relationship frequencies of occurrence. For example, the INVOICE entity volume and relationships — derived originally by an analysis of the business rules — have been revised in Figure 4, following the quality test.

Process Verification Phase

The data analysis technique of process modeling further validates the data model. It determines whether

all necessary data entities, data attributes and data relationships have been identified so that the data model can support required application processing.

This may be represented as batch processing, on-line processing or both. We will use the term "transaction" to refer to all application processing.

Application processing relates to the references made to different data entities by specific transactions — to

retrieve, add, delete or modify data attributes within data entities; or to establish, use or remove relationships between data entities.

Process modeling addresses the logical design of application programs by identifying "transaction usage paths" for each transaction. Process modeling identifies different application processing strategies that may be adopted by the programmer. It helps identify optimum strategies to address specific performance or business requirements.

Process modeling requires the data analyst to place himself in the position of the programmer, who will eventually commit processing logic to program code. However, in process modeling the data analyst only identifies data to be referenced, not the detailed processing to be carried out against that data.

Stage 7: Transaction processing. Examination of the way transactions reference various data entities and data attributes (to carry out their processing) identifies an access or usage path which that transaction takes through the data model. There may be several potential usage paths.

For some transactions, the sequence in which data entities are referenced may be vital to the logic of that transaction processing. For other transactions, the sequence may be less critical.

Transaction Usage Map

A transaction usage map documents that section of the data model relevant to a particular transaction. This is also called a "user view." It documents the particular transaction usage paths taken.

Identification of possible transaction usage paths is carried out by the data analyst in terms of the application and user processing requirements and their impact on the data model.

Figure 5 illustrates a typical transaction usage map. This shows a transaction path as a dashed, arrowed line — the arrow indicating direction of access by the transaction through the data model. (The transaction represented is the one that produced the invoice in Figure 2.)

Stage 8: Transaction performance. The reference table at the bottom of the transaction usage map in Figure 5 is completed at this point. The number of logical references made by a transaction are calculated based on the defined usage path. The term "logical reference" refers to each reference made by a transaction against an entity.

These references are called logical references, as no judgment is reached at this point as to how the reference should be made. It may be a reference made by a physical I/O access to a file or data base record; it may be a reference to an entity retained in an I/O buffer; or it may merely be a reference to an entity represented by a table held in main storage. The physical nature of that reference is left to



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the later stage of physical design — either physical file design or physical data base design.

However, the number of logical references along a usage path is indicative of the processing load represented by a transaction. The sum of all logical references represents the total logical processing of a transaction.

The total logical references made by different transactions can be compared. This identifies those transactions that represent the greatest relative processing load against the data model (that is, the highest number of total logical references).

The total logical references can also be used as a basis for an "empirical" estimate of possible physical response time if a preliminary physical file design or physical data base design is considered. This response time may be evaluated against the end user's absolute response time (performance) requirement. Estimated transaction response times that exceed the end user's maximum acceptable response indicate potential response-critical transactions.

The data analyst may consider data model restructuring to minimize logical references made by response-critical transactions; the data base administrator takes these response-critical transactions into consideration during physical data base design to optimize physical performance for those transactions.

The transaction usage map in Figure 5 illustrates a reference table. This is used to calculate transaction performance for production of the invoice in Figure 2. A total of 19 logical references are made to entities in the data model for each transaction. Based on a transaction volume of 100 invoices per hour, this represents a total load of 1,900 references in that period.

Each significant transaction is considered in turn, identifying the usage path that transaction takes through the data model. We must now consider those transactions that will process concurrently during the selected processing period.

These concurrent transactions may all be on-line, or they may be a combination of on-line and batch transactions (programs). By combining logical references (taken by each concurrent transaction) along specific usage paths, we can determine the cumulative logical references along all usage paths and, therefore, the total processing load against the data model.

Stage 9: System performance quality test. The concurrent processing load is determined by development of two maps: the combined usage map and the loaded composite map.

The former documents on one form concurrent transactions against the data model and their load contribution along each usage path during the selected processing period. This map is used for development of the loaded composite map.

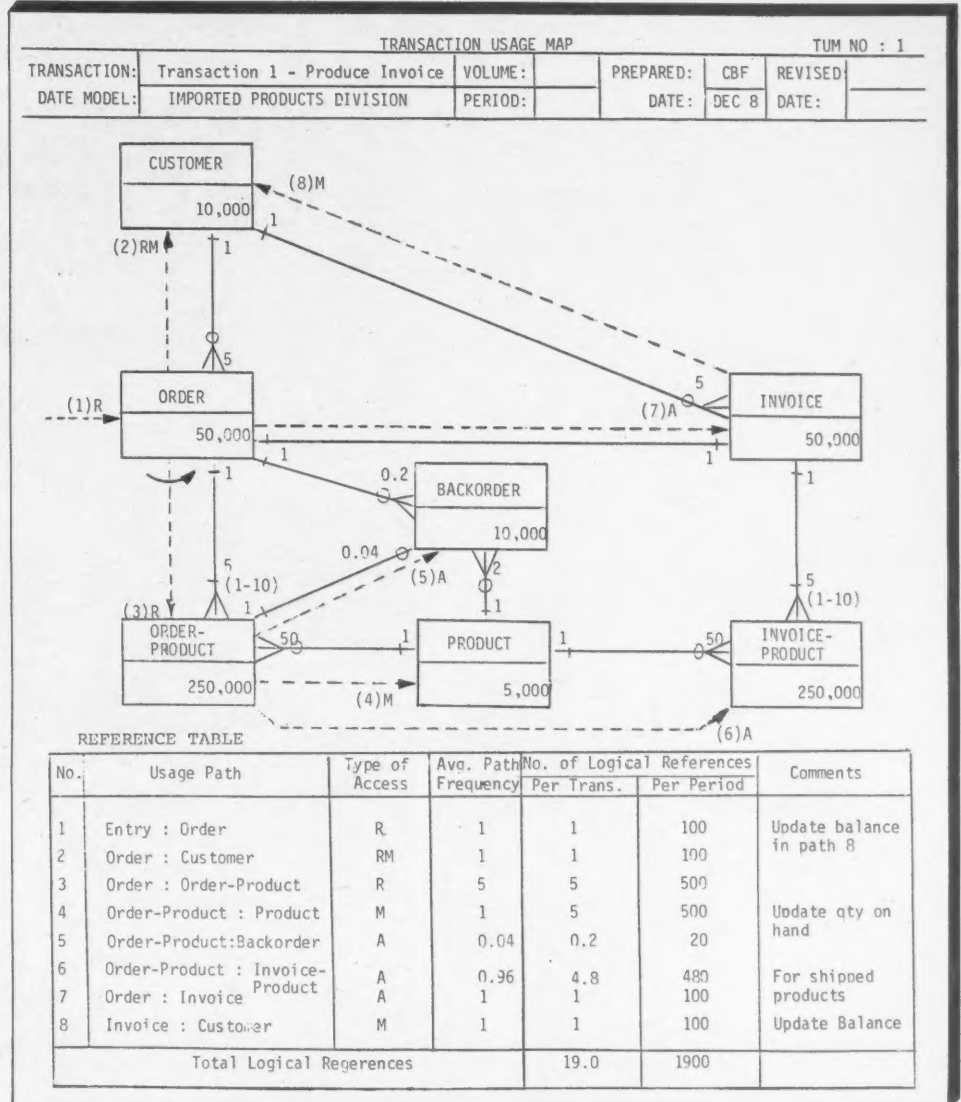


Figure 5. Final Transaction Usage Map for Transaction 1 — Produce Invoice

The loaded composite map identifies the most heavily referenced usage paths. Subsequent physical file design or data base design optimizes performance along those paths.

To summarize, data analysis can benefit the organization in the following ways:

- Data models can be developed to consolidate the data resource essential to a functional area.
- The organizational policy (or business rules) that relates to that functional area is implemented clearly in data relationships.
- Users and management are directly involved during normalization to establish the true meaning of data.
- Redundant data is identified and minimized through normalization.
- The resultant TNF data model is stable and able to accommodate future business change with a mini-

mum of reprogramming.

- The organizational validity of the TNF data model is cross-checked by development both from business rules and from TNF data entities.

• Data volumes and association frequencies of occurrence are clearly identified.

- The relative performance of different transactions can be determined to identify response-critical transactions.

• The data model can be optimized to improve the potential performance of response-critical transactions.

- The performance impact of concurrently processing batch and on-line transactions can be assessed.

• Data analysis enables a logical data model to be developed, but does not assume prior data base experience.

- Data analysis provides direct input to data base design.

• The data model produced is independent of the data base management system (DBMS) and able to be implemented using conventional files, any of today's DBMS products or relational data base.

Data Base Design

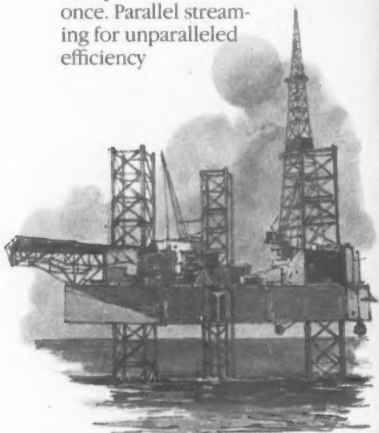
The loaded composite map and each separate transaction usage map provide vital input to subsequent physical design and implementation of the data model, using either conventional files or data base. The data base administrator is able to determine from the loaded composite map the total processing load along each usage path and, from the transaction usage maps, the relative contribution to that load made by each individual

(Continued on In Depth/10)

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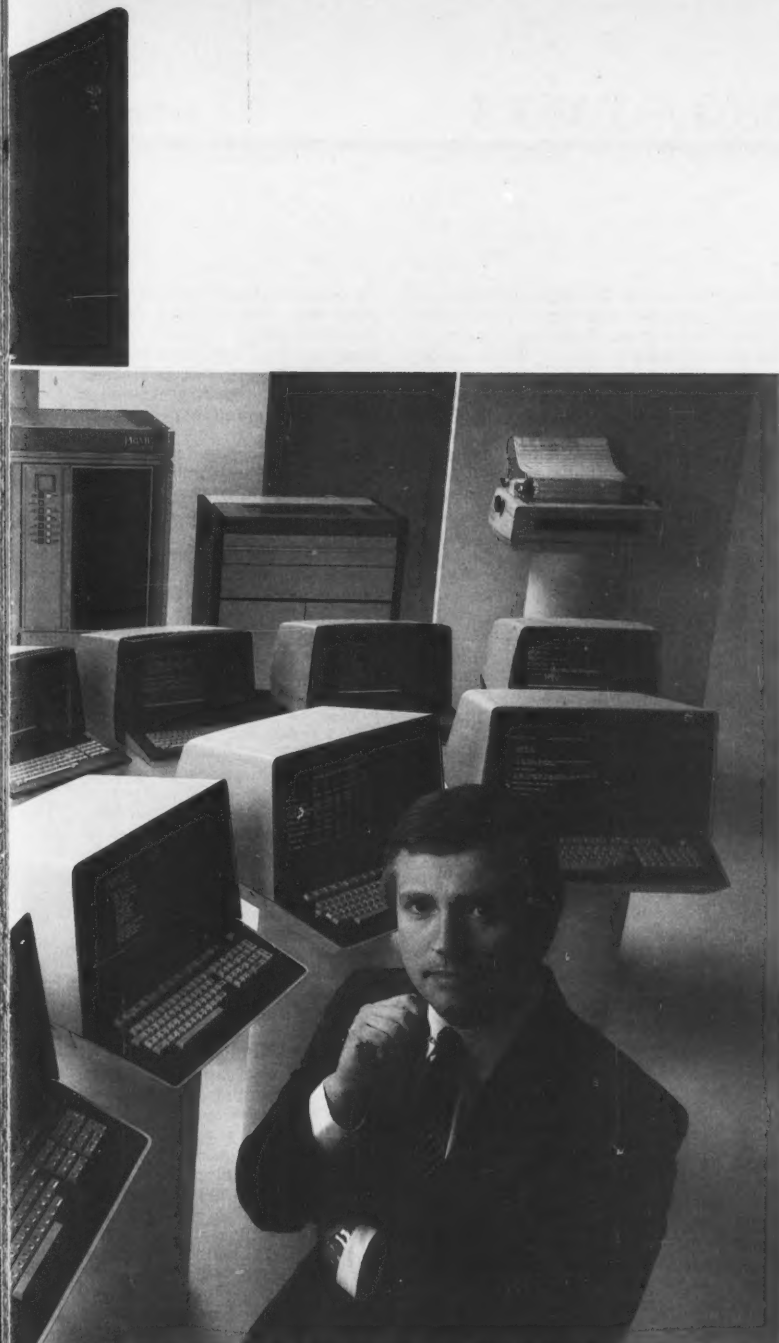
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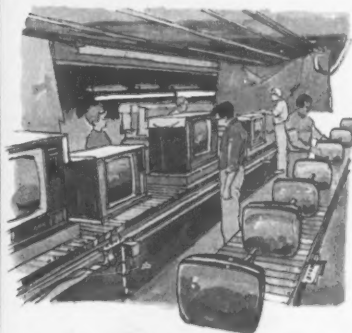


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IN DEPTH

(Continued from In Depth/7)

transaction.

Processing of response-critical transactions can be optimized by considering various physical file or data base design alternatives. The performance of the data base as a whole can also be optimized.

Performance optimization concentrates on translating logical references into the maximum number of main storage references and the minimum number of I/O references.

Main storage references to data can be carried out at CPU speed. Secondary storage I/O references are carried out at disk speed. Physical design minimizes I/O accesses by grouping together (as much as possible) all related data in the minimum number of physical disk records. Specific DBMS features are used to achieve this record grouping for minimum I/O.

Figure 6 illustrates the stages of data base design. Many of these

stages are iterative, optimizing the data base first for response-critical transactions. Following is a brief description:

Stage 1: Input to data base design. This draws on the data model documentation produced during information analysis and/or data analysis. Application processing is defined by procedure formation and/or data analysis.

Stage 2: Schema design. The initial physical design is developed from

the data model and the loaded composite map. The entity list indicates data base record formats. Associations identify data base relationships. Heavily referenced usage paths highlight record grouping opportunities to minimize physical I/O accesses.

Stage 3: Subschema design. Transaction usage maps identify the data base subset (or user view) represented by individual transactions. Response-critical transactions are examined first. The schema design is modified as appropriate to optimize performance for these transactions. Further iterations occur for less critical transactions.

Stage 4: Integrity design. Recovery and restart requirements are taken into account. Security and audit controls are defined and incorporated. The schema and subschemas are modified accordingly.

Stage 5: Operations design. Archiving, reorganization and restructuring of the data base is defined. Appropriate archiving strategies are assessed to optimize performance for response-critical transactions based on physical and application considerations. Operational interfaces with existing applications and distributed processing are identified based on required concurrent processing.

Stage 6: Performance design. The performance impact of recovery and restart data base change logging is assessed. Archiving, reorganization and restructuring strategies are reviewed. Concurrent system processing impact is evaluated. Only at this final stage is the physical definition of the data base considered.

Physical record (block) sizes, access method and data base buffer decisions are made. Actual (physical) transaction performance is then estimated and evaluated. Based on physical performance estimates of response-critical transactions, some of the data base design stages may be further iterated.

Some Case Examples

Many government and commercial organizations in Australia, New Zealand, the U.S. and Southeast Asia have adopted the information engineering data analysis and data base design methodologies.

The administration of a large university used the data analysis and data base design methodologies to develop a student records system. The university's analyst had previously tried to develop this system with only limited success because of the university's lack of data base experience.

An information engineering consultant was engaged to carry out data analysis and data base design of this system. He was expected to complete the project himself, rather than train the administration department DP personnel. A user was allocated part-time to assist.

The project involved initial data identification, data analysis, physical

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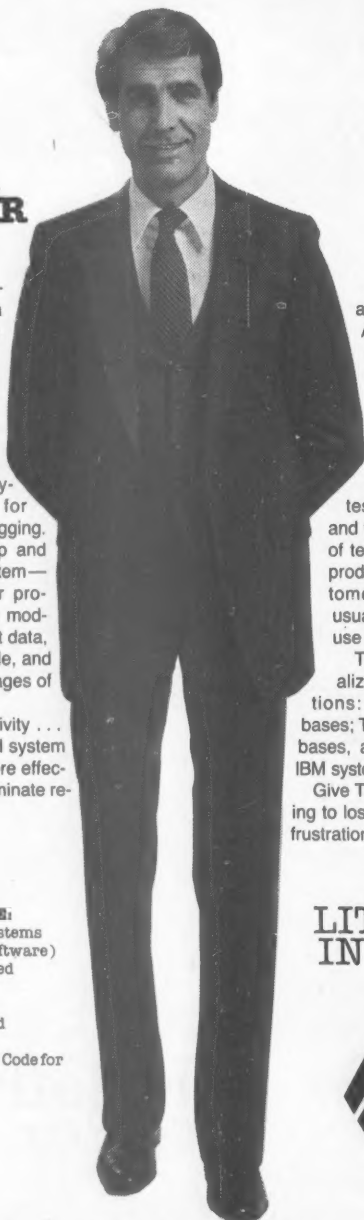
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IN DEPTH

data base design and documentation based on IBM's DL/I DOS/VS DBMS.

Sixty data entities were identified relevant to the student records system — with approximately 600 data attributes.

This project involved 40 days of work for the consultant, with the user involved 50% of his time.

In another application, a large manufacturer required a data base for part of its plant, which used IBM's IMS/VS DBMS. The DP department initially estimated that this data base would involve approximately 1,700 data attributes.

With the assistance of the data base supplier, the DP department concentrated first on identifying the relevant data for loading into IBM's DB/DC data dictionary preparatory

to commencing data base design.

However, the staff was hampered because it knew little about the data relevant to the plant. It was able to identify and define an average of only five data attributes per week. At this rate, it would have taken some six or seven years to complete data identification before data base design could commence!

Plant foremen, assistant foremen and clerks (with no DP experience) were the ones who really knew about data relevant to the plant. It was decided to train these plant personnel in data analysis.

A project team was established of 11 users (plant personnel) plus 11 DP personnel — equal numbers, for political reasons. The team included analysts and data base administration staff.

Initial data analysis education was conducted in-house by an information engineering consultant. This was completed in October.

Data identification was completed by January. At this stage, 2,800 data

attributes had been identified.

Normalization was completed by March. Identification and resolution of synonyms and homonyms increased the number of data attributes

(Continued on In Depth/12)

DATA BASE DESIGN

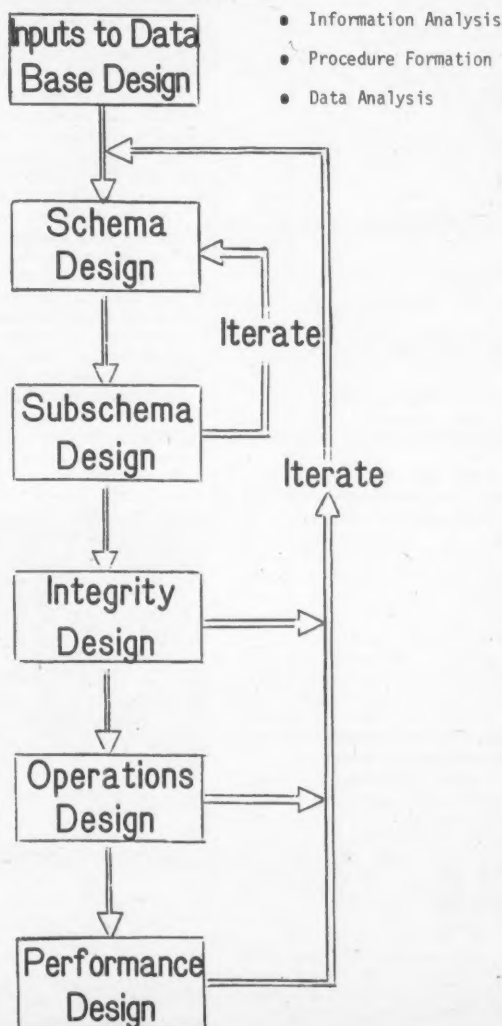


Figure 6. Data Base Design Stages



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IN DEPTH

(Continued from In Depth/11)
to 3,500.

The data model was completed by May. By then there were 3,700 identified data attributes and 530 data entities representing more than 40 subject data bases (functional data models) and more than 40 different application systems using those data bases. And these data models were defined mainly by users!

Identification of required application processing (to be carried out

against the data model) commenced in January and continued with completion of the data model. This was used for process modeling validation from May — leading into detailed application design and development of the highest priority application systems.

The result of this project was the development of a very large data model, consolidating all relevant data throughout the plant.

A government organization first in-

troduced data analysis and data base design in 1978, following an evaluation of IBM's data structuring methodology and of the IBM Data Base Design Aid (DBDA) software package. The group found that data analysis "resulted in a better IMS design than data structuring, and DBDA was easier to use and faster." Its first applications were implemented using IMS/VS.

The department subsequently moved to Software AG's Adabas, to

use Natural — the Adabas end-user language. This move to another DBMS was easily accomplished because of the DBMS-independent nature of the data models developed by data analysis.

The organization subsequently introduced information analysis (as functional analysis) in 1979. A budget emphasis was taken in its development of a corporate data model. This data model was performance-optimized using data analysis and implemented with Adabas.

A large, established insurance company adopted data analysis initially to assist in designing a data base for its life insurance policy system. This was carried out by DP analysts, following in-house education in data analysis.

According to one of the analysts, data analysis "enabled us to break things out into the various component parts so that people with the knowledge of the data could be readily identified. Without data analysis, you just wouldn't have the visibility."

One final example: As a user of software engineering for several years, a large bank adopted data analysis in 1978 in its data base support group for normalization and consolidation of structured analysis data stores. It was quite successful in interfacing structured analysis to data base.

However, the bank found that by confining data analysis to the data base support group, the organization was not achieving its full potential. When data analysis was adopted more widely by analysts throughout the bank, the data base group could concentrate on physical data base design. The systems analysts then included data analysis as a normal extension of their work.

Next week: Deriving procedures from a data model.

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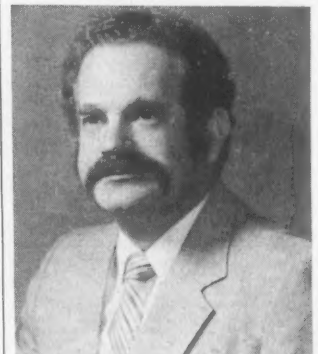
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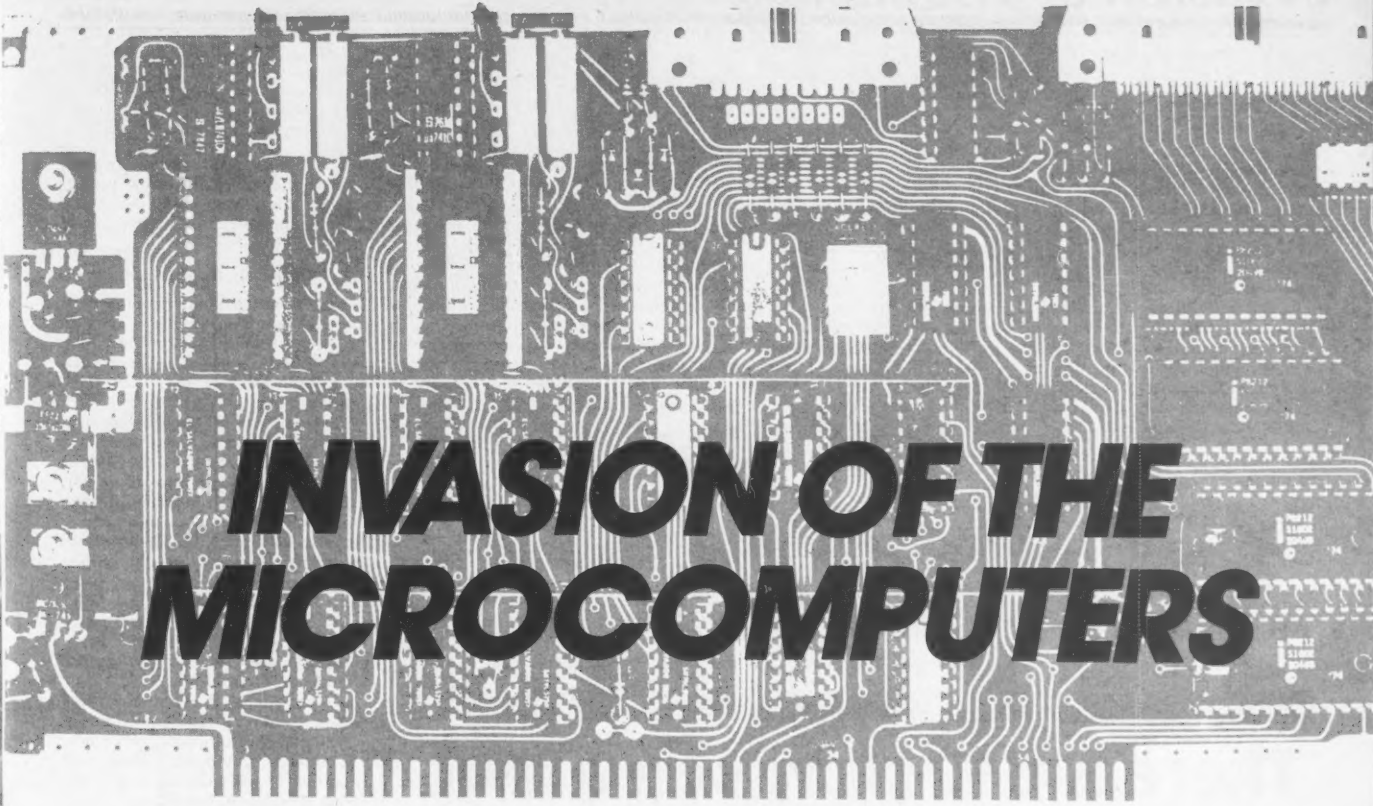
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Clive Finkelstein has spent 20 years in DP, 15 of which were with IBM in the U.S. and Australia. He founded Infocom Australia in 1976.

His firm is now known as Information Engineering (Aust) Pty. Ltd. and has subsidiaries in New Zealand and the U.S. The latter, known as Information Methods (U.S.A.) Corp., is located in Boston.



INVASION OF THE MICROCOMPUTERS

By Elizabeth M. Ferrarini

Personal computer. Home computer. Small business computer. S.I. Hayakawa, U.S. senator from California and well-known semanticist, would say the meanings of these terms are not in the words themselves; they are in us.

Five years ago a computer hobbyist might have said that "personal computer" meant a computer kit one ordered from *Popular Electronics* magazine. A small business computer to an IBM sales representative could mean a \$20,000 system a one-person business would buy.

To others, a home computer means a device that allows one to play backgammon with a television set. To some accountants, stockbrokers, lawyers, insurance agents, financial officers and engineers — to name but a few — these terms connote a low-cost, labor-saving device that performs one or more useful functions during a typical workday.

But Hayakawa would also say that words are not the things they stand for in our head. In fact, all of these names refer to a new breed of computers that can be classified as microcomputers.

As compared with minicomputers, microcomputers support fewer and smaller peripherals and have less processing power. Data storage peripherals for a microcomputer include either tape recorders or floppy disk drives — either mini or full-size disks in a variety of densities. Available output devices include an assortment of printers: typewriter quality, dot matrix or thermal. A 300

Microcomputers can perform functions such as economic modeling, word processing and maintaining a small data base of information. The hobby computer of five years ago has become a serious tool for businesses ranging from the one-person shop to Fortune 500 companies.

bit/sec acoustic coupler allows a microcomputer to communicate asynchronously with similar devices or a time-sharing service.

The central processing unit of a microcomputer contains an eight- or 16-bit-word microprocessor; memory sizes of the CPU range from 4K to 64K bytes. A microcomputer's configuration depends on the user's application(s) and the memory size of the CPU required to support the software and the desired peripherals.

For example, 48K bytes of memory may be required to support dual minifloppy disks, a typewriter-quality printer and word processing software. Likewise, 16K bytes of memory may support a thermal printer, a single minifloppy drive and certain software packages.

The microcomputer market is noticeably different from the rest of the computer industry. Instead of companies like Wang Laboratories, Inc., Digital Equipment Corp. and IBM as industry leaders, one finds Tandy's Radio Shack, Apple Computer, Inc., Commodore Business Machines and dozens of others.

Buying a microcomputer doesn't require a visit from a sales representative armed with literature. Instead, a potential user goes to a retail store that sells microcomputers. The prices of microcomputers lure most people into considering these devices. A microcomputer ranges from \$399 for Radio Shack's Videotex, which has limited computational ability but can access several time-sharing services, to \$7,500 for Commodore's Pet, which functions as a word processing system comparable to an IBM Displaywriter.

Apart from the price, the business and professional market has discovered that microcomputers can perform functions such as economic modeling, word processing and maintaining a small data base of information. Thus, the hobby microcomputer of five years ago has turned into a serious tool for the owners of a one-person business as well as professionals in Fortune 500 corporations. Here are a few ways micros are helping people get the job done.

An Insurance Agent. While looking

for a hobby, Al Smith, a State Farm Insurance agent from Columbus, Ohio, decided to invest in Radio Shack's TRS-80 Model II microcomputer. Although Smith has an associate's degree in engineering and took a course in Cobol programming 15 years ago, he had had little hands-on experience with computers before buying the TRS-80. "I thought it would be easy to get into computers," he said.

Smith has used his TRS-80 for about a year now as a data base management system for his one-person office and as an educational device for his children. He has recorded on floppy disks the pertinent information from three four-drawer file cabinets which contain documents such as automobile policies. If one of his clients calls, he types in the person's name and the file appears on the screen. This application saves him a lot of refiling time, he said.

Smith doesn't use the machine for client billing because State Farm bills the clients directly, but he does have a program that computes automobile insurance rates.

Smith's TRS-80 contains a dot matrix printer, 64K bytes of memory and two full-size floppy disk drives. "IBM sells a comparable model for twice the price," he claimed.

The Attorney. A year ago, Mark Linder, a Boston attorney, decided to buy a word processing system for his seven-partner commercial law practice. After looking at systems manufactured by Wang and IBM, Linder

(Continued on In Depth/14)

IN DEPTH

(Continued from In Depth/13)
went to New England Electronics Co., Inc. (Neeco), a retail computer store, and bought Commodore's Pet with Wordpro 4 software.

"I walked out of Neeco with 32K bytes of memory, dual minifloppy drives and a NEC Spinwriter type-writer-quality printer — all for about \$7,500. Some machines in the \$15,000 range weren't different enough to warrant spending the extra \$7,000. With the exception of the dictionary,

the Commodore has features similar to the IBM Display-writer. I also use my machine for 'number-crunching' tasks such as payment schedules and amortization tables," he said.

Linder and a programmer friend plan to market a legal time-billing software package they have developed for Commodore's Pet.

Unlike the Wang or Digital family of word processors, the Commodore functions as a stand-alone device. Now, Linder can only upgrade his

machine to higher capacity disks, he said.

The keyboard on Linder's Pet performs word processing and DP functions. Because the keyboard has a limited number of word processing function keys, the user executes most operations by typing alpha mnemonics and pressing a command key. Of course, one could argue that this method does not provide the ease of operation associated with word processors from Wang or IBM. But ac-

cording to Linder, "A machine's operation depends on one's preference." He is comfortable with the Commodore because "everything is done logically."

Corporate Applications

Apart from the one-person business or small law practice, microcomputers have started to make a slight dent in businesses of all sizes — especially those with sales of more than \$100 million a year.

A Financial Officer. About a year ago, Steven Stadler, chief financial officer at Genrad, Inc. of Concord, Mass., bought an Apple II microcomputer with two floppy disk drives, a color monitor, 48K bytes of memory and a daisywheel printer. While exploring the capabilities of the machine, Stadler used a software package called Visicalc, from Personal Software, Inc., to do some financial modeling for Genrad, a manufacturer of automated test equipment with sales of about \$150 million in 1980.

The company had been doing financial modeling on a time-sharing firm's model. Stadler thought a microcomputer would be a good tool for others in the company to use for "what-if" kinds of modeling.

"Once I satisfied myself that this was a useful thing to do, I started introducing some of the financial staff to the Apple and the Visicalc concept," Stadler said. "We have 13 company-owned Apples — including one I use in my work. Some are used by the financial department, and the marketing department uses the Apples to make projections about various product lines."

By using a microcomputer and a software package like Visicalc, a company can project how a new product line will do each year, based on "what-if scenarios." For example, if the price of a raw material increased by 14% the second year the product was in production, the system would predict the effect on the product line, he said.

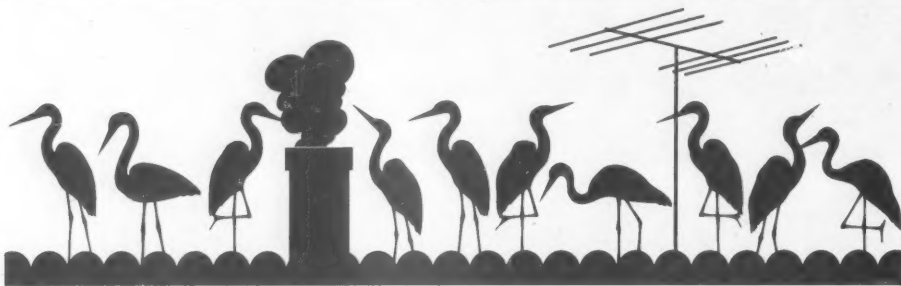
Unlike a programmable calculator, a microcomputer using Visicalc stores the figures for review and recalculates the answers automatically if a value is changed.

Graphics Benefits

Stadler uses a graphics software package called Apple Plot to present financial data in pictorial form to groups of managers. "I find this application helps to focus a discussion on the essential elements rather than getting buried in numbers on a printed page," he said. Because the Apple can drive a projection-television set, charts and graphs it generates appear on an "electronic blackboard."

Although Stadler does not have an engineering or computer background, he had no problems dealing with the Apple. "I have lived with computers for a long time," Stadler said. "I know many people suffer

(Continued on In Depth/16)



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INVASION OF THE MICROS

In Depth/16

IN DEPTH

(Continued from In Depth/14)

from computer anxiety, but that is a cultural thing. It may be another 10 years before that situation changes."

Stadler, who is in his mid-50s, programs his Apple with Basic and Fortran. He belongs to the Boston Computer Society's Apple users group.

An Accounting Firm. Two years ago Rick Richardson, national director of computer auditing for Arthur Young & Co., decided that microcomputers could be a viable alternative to time-

sharing firms for problem-solving applications. As a result, Arthur Young & Co., one of the nation's largest public accounting firms, has bought about 50 microcomputers — most of which are Apple IIs costing between \$4,000 and \$5,000 per unit.

Instead of using a time-sharing firm for applications such as loan and lease amortization, discounting and present value, cash flows and random sampling, the firm uses microcomputers. It developed the software

for the random sampling and discounting applications.

'Enormous' Savings

"Some of our offices use microcomputers for clients' financial planning," Richardson said. "In these applications, the cost savings of using microcomputers rather than time-sharing can be enormous." In the area of financial modeling, the firm uses Visicalc. In the New York office, which has nine microcomputers, the

firm uses several data base packages for tracking the different jobs done at all of the offices.

Occasionally, Richardson uses his microcomputer for word processing tasks. "I can type faster than I can write," he said. "It is easier for me to type something as a first draft and give it to my secretary to polish." Richardson's system has 48K bytes of memory, two floppy disk drives and a printer.

Richardson has an Apple II at home and has developed a home financial system that writes his checks on pre-printed check stock. The system also tracks his energy usage.

A Brokerage Firm. At Bache Halsey Stuart Shields, a large brokerage firm based in New York, James Settel, a senior vice-president in charge of marketing development, and his secretary use a \$3,600 Apple II microcomputer for keeping records on branch offices and account executives.

"My office keeps records on account executives and their achievements. We know such things as the date they were hired and their sales records. We keep information on account executives who belong to the many Bache recognition clubs," he commented.

The data base software package running on Settel's micro can search and compile a report on any desired selection criterion. According to Settel, the system can compile a report of all the account executives in the Southwest region who have produced a certain amount of business within certain dates.

"The system, which we have been using since May 1980, saves us a tremendous amount of time and allows us to add and update records easily, and compile and print reports," he said.

A Fortune 500 Company. At Johns-Manville, a Fortune 500 manufacturer of building materials, engineers use nine Apple microcomputers for a variety of engineering applications. Using software they developed, engineers predict at what point condensation will occur within a built-up roofing system. Milton Trosper, district engineer for the company's Fort Worth, Texas, sales office, said this application "eliminates a designer's putting the installation in the wrong place."

By using a software package called Desktop Planner with the Apple, Trosper's office, which does \$30 million in business annually, calculates and prepares monthly and quarterly reports for sales representatives and management. These reports show the projected sales expectancy for 100 different products compared with how well the product did.

"Once you put in each product's percentage of gross sales by territory and the territory's gross expectancy, the micro redefines the expectancy for each one of the products and cross-references that figure to actual sales," Trosper said, adding that he



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IN DEPTH

could use a programmable calculator for this application, but "it would require too much keying."

The Fort Worth office, which has a small clerical staff, uses the computer to update price lists of petroleum-based products.

"Since we are dealing with a raw material that is volatile in its pricing structure, the Apple allows our staff to generate day-to-day price lists, if necessary, for the field. This application eliminates a tremendous amount of typing," Trospen continued.

Trospen's office has been using the Apple since 1977. It cost the company about \$2,500 for a machine with 32K bytes of memory, a floppy disk drive and a printer.

A Consultant. Stuart Lipoff, a senior consultant with the Electronic Systems Division of Arthur D. Little, uses an Apple II as a "fancy calculator." According to him, "It not only gives the answers to calculations, but can provide alpha or numeric headings for each step. I also use the Apple to send Telex messages from my desk into an intelligent modem."

Lipoff came by the microcomputer quite by accident. The firm bought it to do a proprietary study for a client on professional employees' uses of microcomputers. After the report was finished, the client did not want the device.

Who Picks Up the Tab?

Despite the many problem-solving capabilities of microcomputers, they have raised questions for management: Who should pay for them — the company or the employee? What role should the DP department play in the installation of microcomputers?

Besides Settel's Apple, which is one of the few microcomputers in the Bache home office, about 50 account executives in various branch offices use microcomputers they bought themselves.

"Each company has to make its own decision as to whether it should pay for these devices or say to the account executive, 'Do your best.' The key is a good software package that account executives can use with a microcomputer," Settel said.

According to Richardson, the microcomputers at Arthur Young tend to pay for themselves fairly quickly, depending on how they are put to work. "If an office uses a microcom-

puter to support consulting engagements, then the device will pay for itself in several engagements. In other situations, the cost savings of not doing a task manually justifies the microcomputer. On the average, we have a payback situation of about a year."

Kenneth Bosomworth, president of International Resource and Development, a marketing research firm specializing in the DP industry, commented: "I don't think large

companies make decisions to invest in microcomputers. Professionals within companies see the opportunities for using these devices for specific tasks and go ahead and buy them. Some microcomputers cost less than a typewriter. A large business doesn't view \$2,500 or so as an investment, but petty cash. [But] I don't see any organized movement in large businesses to place microcomputers on every desk." Bosomworth's company owns a Radio Shack TRS-80

microcomputer.

Stadler added his view, saying, "We started out with three Apples. As other people in the company saw what the micro could do, they went out and bought one."

Norman Wiser, senior consultant in the Information Systems Management group of Arthur D. Little (ADL), bought an Apple to use at home for his work.

"Most of the professionals who

(Continued on In Depth/18)

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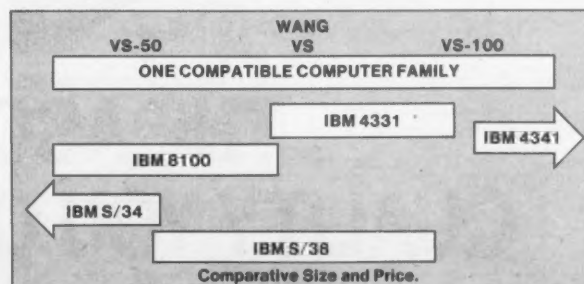
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IN DEPTH

(Continued from In Depth/17)

have microcomputers at ADL own them. There are some that the company has purchased. We are putting pressure on management to get microcomputers because it would be a beneficial and productive move. Within five or six years, those of us who want a microcomputer will have them supplied by the company, or the company will subsidize half the purchase.

"At one time, ADL would subsidize the purchase of a programmable calculator. I think there are some other companies that do the same. When it comes to microcomputers, some companies may take the attitude that if the employee uses it for work, the company will pay for it," he said.

"It's nonsense to say that people in large companies with centralized DP departments don't need microcomputers. People like me or those who work for me find it painful to do a lot of computations with a pencil and paper. By making a small investment in a microcomputer, you can make yourself more productive. The applications I'm talking about aren't important enough for the DP department to write a program. It's not worth it," added Stadler.

Trosper said engineers at Johns-Manville "had to twist a few rules to get the authorization to buy the microcomputers. The biggest stumbling block was the IBM philosophy of our DP department. This department sees microcomputers as toys one hooks up to a television set to play games. But management has started to change its attitude toward microcomputers because of the reports we have generated using Desktop Planner and some of the other programs we have written in-house.

"I have some friends in other Fortune 500 companies who would love to have microcomputers, but haven't been able to figure out a way around the bureaucratic system in their company. The DP department wants to hang onto its empire. It doesn't realize that microcomputers will save the large mainframe from a lot of routine work."

Sales and Service

In the areas of distribution, software, support and service, microcomputers present some unique situations for the one-person business or the Fortune 500 company.

In 1975, one could purchase a mi-

crocomputer kit from a mail-order company, such as Heath Co. Although companies still sell these kits, the computer retail store has become the prime distributor of microcomputers for manufacturers such as Tandy and Apple Computer.

Tandy's Radio Shack sells its TRS-80 line of microcomputers and software through its 92 nationwide computer stores. All of the 7,000 nationwide Radio Shack electronics stores feature the lowest priced TRS-

80 model. About 122 of these stores have separate departments for the complete TRS-80 line.

Apple Computer sells its microcomputers and software through 1,200 nationwide independent computer stores and chains, such as the Computer Store and Computerland. An independent can function as the authorized distributor for several manufacturers.

What can a potential user expect from a computer store? According to

Stadler, "The independent computer store has a reasonable amount of expertise. But one better know what he wants before he walks in."

Some computer stores' salespeople have programming backgrounds; others have little knowledge of computers. But most microcomputer manufacturers make sure that a store's salespeople can demonstrate the machine, answer customers' questions and talk about the competition.



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In 1978, 780 computer stores existed; by 1983, the number should triple. Retailing has provided microcomputer manufacturers with an opportunity to reach the four million businesses with fewer than 200 employees before larger companies tap this market.

Enter the Dragons

IBM, Xerox Corp. and DEC have all discovered the advantages of retailing — especially for reaching small

businesses.

DEC, one of the first computer manufacturers to open its own retail stores, has about 25 stores nationwide. The stores feature a word/data processing system for less than \$5,000. This LSI-11 version of a PDP-8 features a CRT terminal, two full-size floppy disk drives and a dot matrix printer. The word processing software sells for \$500.

But retailing has not come easily to DEC. In 1980, the company closed

three stores because of poor sales. Meanwhile, the company has outfitted sales representatives with a fleet of vans loaded with demonstration equipment.

Xerox has 10 office products stores in the U.S. and plans to open 50 by the end of 1981. These stores sell everything from typewriter ribbons to older model photocopiers. Xerox anticipates going to direct mail as another way to sell its office products.

In 1978, IBM opened a series of

Business Computer Centers in the U.S. to sell "low-end items" such as the 5110 and 5120. Although not a microcomputer, the 5120 is currently IBM's lowest-priced general business system. A standard 5120 sells for \$13,500 and has a 9-inch display, a typewriter keyboard, two mini-floppy disk drives and a printer.

In November 1980, IBM opened its first office products retail store in the U.S. The Philadelphia store sells Selectric typewriters, the Displaywriter word processor and copiers. Analysts predict that in mid-1981, IBM will add a microcomputer to its retail store product line.

Control Data Corp. has two retail stores and plans to open 200 more within the next two years. The company plans to sell microcomputers manufactured by Ohio Scientific, Inc., which is owned by M/A-Com, Inc. Montgomery Ward, a department store chain, also plans to sell Ohio Scientific microcomputers.

Data General Corp. decided against opening its own stores. Instead, the company prefers to sell some of its products through independent retailers.

Putting Micros to Work

The boomlet in canned software has shifted the microcomputer market's growth away from the hobbyist and toward the business market. "Some software packages, such as Visicalc, were developed by users and then commercially marketed," Richardson said. "Visicalc sold 20,000 Apples. People bought Apples until Visicalc was available on the TRS-80 and Pet.

"The quality of software for microcomputers ranges from inferior to good software that is tough to duplicate. A company has to decide if it is better to buy software or more economical to develop it," he said.

Stadler commented that software for the Apple is "impressive and documented well." According to Wiser, "the Apple software is not extensive," but he has not seen any bugs in the packages he has used. Neither Linder nor Smith has had complaints about software from their respective microcomputer vendors.

On the other hand, Bosomworth said that the Scripsit word processing software for the TRS-80 "is reliable, but a few things are missing. Can you imagine word processing

(Continued on In Depth/20)

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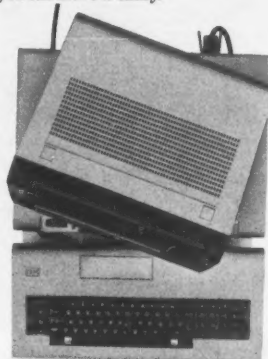
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mental USA, call 800-431-2670. In New York, call 800-942-1918. In Alaska, Hawaii and Puerto Rico, call collect 914-696-6840. You'll talk to a specialist who can take your order or answer your detailed questions. Delivery of the 3101 can be as soon as 45 days.

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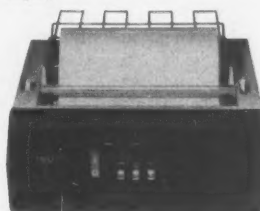
When the 3101 arrives, you simply connect three modular elements—the display, the logic element and the keyboard—plug it in, position the setup switches and put it into operation. It takes just a few minutes. Accessible setup switches in the keyboard let you select functions such as line speed, parity, scroll and reverse video. The 3101 weighs 38 pounds so you can move it easily.



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IN DEPTH

(Continued from In Depth/19)
software that doesn't allow one to underline or to use all three pitches on a daisywheel printer?" he asked. "A company should not be going into a business environment if the software cannot do these trivial things."

A microcomputer user can obtain business software for applications such as accounts payable, inventory and payroll from the microcomputer vendor, computer clubs or third-par-

ty sources. But software is a labor-intensive product. The quality of the software is usually proportional to its price and usefulness. Prices range from \$150 for Visicalc to \$15 for Interlude.

Service Agreements

Most microcomputers come with a free 90-day warranty on parts and labor. This warranty starts from the date of purchase, but extended warranties require careful scrutiny.

Apple Computer offers a one-year extended warranty for \$195. This warranty covers all Apple-manufactured hardware and system software. If an Apple malfunctions under either warranty, the user brings the device to an authorized computer store's service center. If the machine cannot be repaired immediately, the store may loan a user a machine on a temporary basis.

Radio Shack's computer centers offer a carry-in repair service as well as

on-site service in some areas. A one-year on-site service agreement for a TRS-80 depends on the machine's configuration. The average cost of this warranty comes to about 12% of the machine's purchase price. This warranty covers parts, labor, travel costs and preventive maintenance visits.

New England Electronics Co., Inc., an authorized Commodore dealer, offers both carry-in and on-site service. The cost of a one-year on-site service agreement depends on the machine's configuration.

Linder did not renew the on-site service agreement for his Commodore Pet because the "machine never broke down."

Richardson observed, "Compared to everything else I have seen in DP, the microcomputers are the most reliable. The New York office of Arthur Young & Co. wants to get a multiunit on-site service agreement with the store from which the units were purchased."

Al Smith, who runs his TRS-80 eight hours a day, said he has had "no problems with the machine."

However, Bosomworth remarked that the TRS-80 he bought "had problems that were inherent in the particular model. Radio Shack rectified the problems free of charge. But the problems caused us much grief because the machine never worked. Last May we bought a daisywheel printer from Radio Shack. In June I brought the printer to a Radio Shack service center to be repaired and got the printer back in November."

User Support

User training programs and software support vary with each computer store. For example, when Linder bought his word processing system, a training representative from New England Electronic Co. spent two days training Linder's secretary. "The training was excellent," Linder recalled.

Radio Shack advertises that its salespeople "will assist you in sales, service, advice and even classroom training." A salesperson at the Radio Shack Computer Center in Newton, Mass., said: "We will get the customer started, answer any questions, but we don't provide classroom instruction or modify the software. Most of the documentation is self-instructional." Radio Shack provides users

(Continued on In Depth/22)

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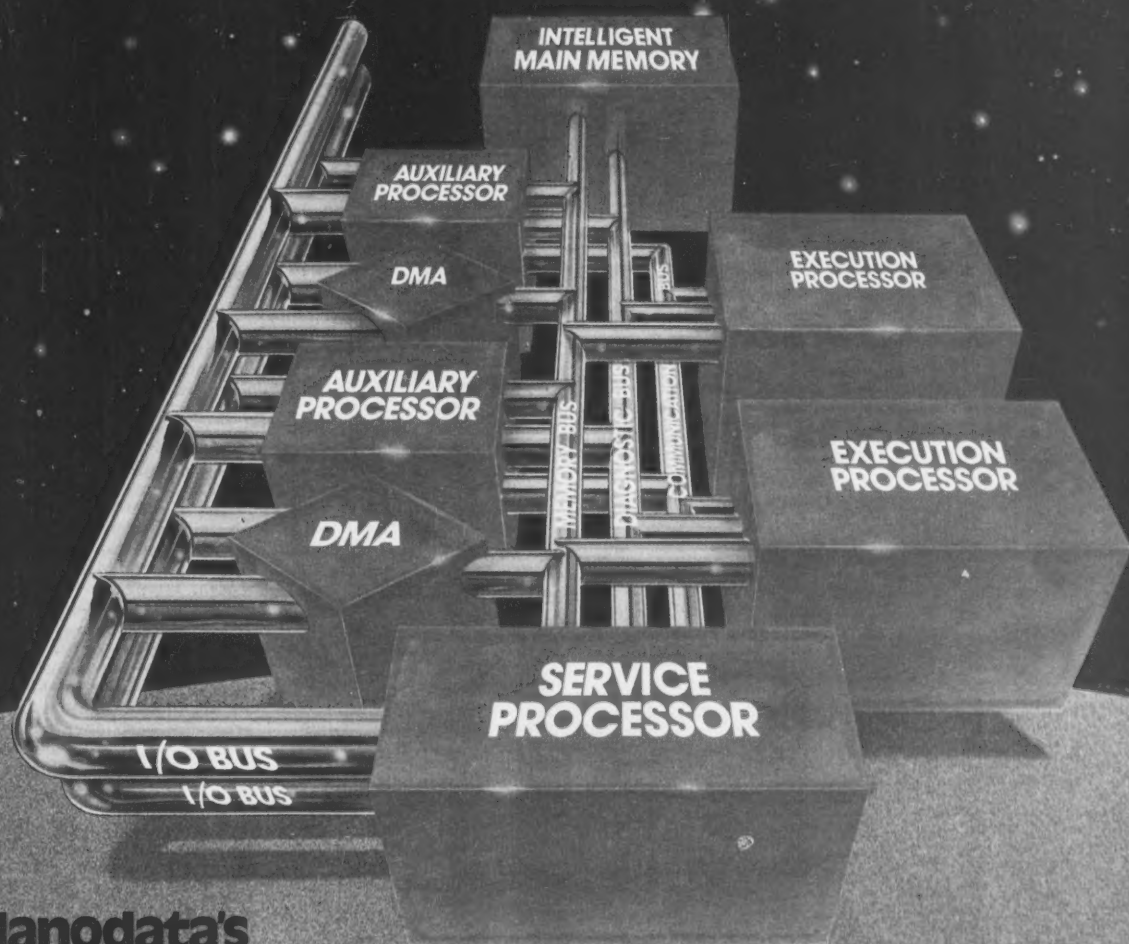
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IN DEPTH

(Continued from In Depth/20)
with a toll-free number to call if they have any questions.

According to a salesperson at the Computer Store in Burlington, Mass., "Most of the manuals for the Apple are self-explanatory. We'll answer questions, show the customer what to do, but we don't provide programming support."

In Bosomworth's view, in order for a microcomputer to be useful to the small business user, "there has to be

support, maintenance and quality in the software. These things are lacking in some of the products."

Dick Bolan, an office automation consultant and owner of a TRS-80, said, "A good deal of a product's cost is taken up by sales, support and service. These costs are running upwards."

Combating Costs

If what Bolan says is true, then one can guess why IBM has started to em-

ploy user-assisted training and user-assisted service programs.

Users of the IBM Displaywriter must install the device and teach themselves how to use it. If the machine malfunctions, the user runs the diagnostics in the equipment before placing a service call. The outcome of the test alerts the user and user representative to the machine's problems. Unlike the Displaywriter, most microcomputers do not come with diagnostics.

Software packages for the IBM 5120 system come with audio cassettes and self-instructional manuals designed for non-DP personnel. If users have questions about the Displaywriter or the 5120, they can call an IBM-provided toll-free number to obtain assistance.

In 1975 Apple Computer, Inc. did not exist. At the end of 1980, the company's sales hit the \$175 million mark. After Radio Shack's first year in the microcomputer business, the company had reportedly sold 150,000 TRS-80s.

The growth potential of the microcomputer market exceeds one's imagination. Some analysts say that microcomputer sales will reach \$3 billion by the end of 1982.

"There is a potential for a tremendous amount of useful work to be performed by microcomputers. This potential will be realized in the next 10 years," Bosomworth commented.

Lipoff sees a vast potential for microcomputers as executive terminals that allow messages to be passed from one terminal to another. However, the lack of a local data network standard, such as Xerox Corp.'s Ethernet, for communications capability between processors within the same building or complex is holding the microcomputer back for professionals and executives. "A stand-alone microcomputer by itself doesn't do much," Lipoff said.

At the Xerox research center in California, one finds Altos microcomputers on every manager's desk. Although Xerox does not sell these microcomputers yet, managers use them for sending messages and for all the other things consultants prophesy for the office of the future. Lipoff considers Xerox "the harbinger of the future" with Altos and Ethernet.

But some individuals have their doubts about the glorious future of microcomputers. The per-workstation cost of multiterminal, intelligent devices such as those offered by Wang will drop below the price of most microcomputers, Wiser predicted.

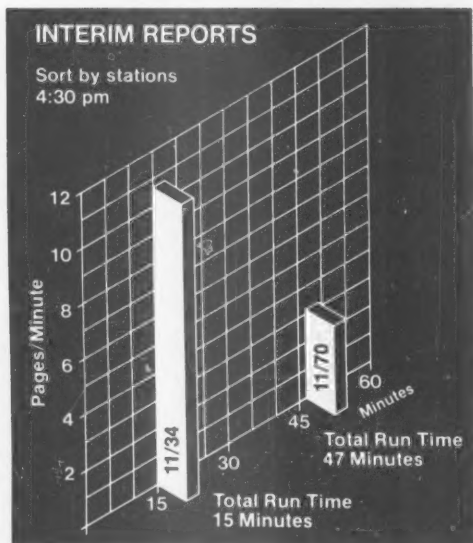
George Colony of the Yankee Group, a research firm in Cambridge, Mass., has said that as micros from Apple and Radio Shack become more powerful, they will get competition from IBM, DEC and AT&T.

Meanwhile, the business market for microcomputers could unlock the home market for these devices. But Bolan begs to differ. He said, "You can put your Christmas card list or recipes on a microcomputer ... but these aren't viable applications."

Perhaps the kind of computing devices that everyone needs will reflect a comment by Albert Einstein: "All truly great things are simple."

Elizabeth M. Ferrarini is editor of "Viewtext," a newsletter on interactive telecommunications published by Information Gatekeepers, Inc., Brookline, Mass.

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That's what happened at San Francisco General Hospital Medical Center. With the addition of Ampex Megastore, processing time was reduced to more than 1/3 the time previously required.

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Ampex Megastore has been in use over one year for Ed Wong, seven days a week, 24 hours a day, without failure. According to Ed, "We put a lot of time and study into our selection of Megastore, so naturally we're very pleased with the results. Our line printer is now running at maximum rate, 600 LPM. Before it was less than half that. During peak load periods, we have experienced no wait time

with our 26 terminals."

Dr. Myron Pollycove, M.D., Director, Clinical Laboratory, added, "We had considerable delays in processing information on the CRT screen, in some cases up to one minute. When you consider the number of inquiries from doctors, that kind of response time is just too slow. Of course, that was before we installed Ampex's Megastore."

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from 1/2 megabytes to 4 megabytes. It's made of core. And it's fast. 3 microseconds, max. And there's no latency. Megastore is transparent to mini-computer software, and requires no program

changes. Additionally, it's high reliability improves system uptime and availability.

Megastore. The higher performance alternative to fixed head disks on PDP-11 minis that provides exceptional throughput and reliability.

For more information about how you can put Megastore to work performing for your system, call Cal Goshi at 213/640-0150. Or write him at Ampex Memory Products, 200 N. Nash Street, El Segundo, CA 90245. Ed Wong did.

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Bank Builds 'Do-It-Yourself' Data Base

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BAKERSFIELD, Calif. — If you want something done right — and for less money — do it yourself.

This philosophy was not exactly what the Community First Bank here had in mind when it set out to build a financial futures market data base and develop a computer trading model, but it is what occurred after the bank took a peek at outside computer costs. Especially those of time-sharing service bureaus. However, rather than installing a stand-alone minicomputer and assorted disk drives, the company plugged in a series of

Apple Computer, Inc. microcomputers that operate in a limited network and share a single hard disk.

The research system, which keeps tabs on the world's commodities and prices, consists of three Apple II Plus microcomputers and a 10M-byte Corvus Systems, Inc. hard disk. Two of the Apples run under a regular operating system and share the hard disk via a Corvus-devised network. The third microcomputer has a Z80 CPU card running under Digital Research, Inc.'s CP/M operating system.

The bank also has a Zeta Research, Inc. Model 1453 plotter

to produce charts and graphs, Susan Zachary, Community First's market research manager, explained.

Eventually, the third Apple will also connect to the disk to enable the bank to plot directly from the media rather than having the data transferred between the microcomputers via floppy disks, she said.

The bank also uses Corvus' Mirror, a system that allows it to periodically back up the entire disk onto a standard video cassette recorder.

The microcomputers are used about 10 to 12 hours each day, at least five days a week. The

system was implemented by Lowell Noble, head of SOCS Management Co., a Calif.-based firm that is in the business of developing and marketing data bases on floppy and hard disks for use by banks, brokerage houses and other financial institutions.

Major Problem

A major problem faced by Community First as it assembled its future data base was the lack of research information on the financial futures market. Because the market is only a few years old, there is very little data available to put into a workable data base. The bank had to start virtually from scratch, performing its own research and development.

The first step was to develop a data base of historical price information. The time-sharing service had such a data base, but it was very expensive, Zachary stated. "Connect time, storage and usage costs add up," she noted. "In addition, we had to devote a great deal of time to editing erroneous data."

On the other hand, SOCS management had a data base that listed historical prices for dozens of commodities on a Corvus Model 11AP hard disk.

In addition, SOCS' Noble had formatted the data on the disk

(Continued on Page 60)

IBM Introduces Pharmacy System

WHITE PLAINS, N.Y. — IBM announced a system that reportedly can help pharmacists alert customers to possible drug interactions or allergy reactions, maintain and update patient profiles and prescription records and print year-end tax reports for customers.

The vendor also unveiled a new model of its 3651 store controller, which reportedly has expanded storage to allow pharmacies and other stores to add new functions to their systems as their requirements change.

The pharmacy system consists of the IBM 3685 display control unit with an optional report printer for patient profiles or store reports and either a label or validation printer for charge-card transactions and check handling.

It also includes the IBM 3686 display station, which can highlight patient data through such devices as blinking, underlining and reverse video, according to IBM.

Third-Party Billings

Pharmacists can use the programmable system to keep track of Medicaid, Blue Cross and other third-party billings, to process nursing home orders and prepare medicine labels, the vendor said.

The IBM Pharmacy Applica-

tion/Store Environment program product is said to provide the application programs for prescription processing, label and report generation and drug pricing, based on store-specified formulas.

A pharmacy workstation, including the IBM 3685 Model 2 display control unit with a report printer and a label printer, the IBM 3686 display station and associated features can be purchased for \$7,241.

The new model of the IBM 3651 store controller, with 18.4 million-char. disk storage, can be purchased for \$26,900. The

license fee for the IBM Pharmacy Application/Store Environment program product is \$42/mo for 48 consecutive months for each 3651 controller using it.

First customer shipments of the IBM 3685 display control unit and IBM 3686 display station are scheduled to begin in the third quarter of 1981.

The IBM Pharmacy Application/Store Environment program product will be available in the first quarter of 1982, the vendor said from 1133 Westchester Ave., White Plains, N.Y. 10604.

Business Net Out for Small Users

AURORA, Ohio — An integrated business system network designed for small businesses, company departments and remote branch offices has been announced by Ohio Scientific, Inc.

IBS-NET places microprocessor-based workstations at each key desk and connects them to central disk files, printers and remote communications channels, the vendor said.

The system features the ability to allow end users to start with a stand-alone system and later configure it with multiple terminals as time-share systems and ultimately network it un-

der IBS-NET. IBS-NET is priced at \$995 from Ohio Scientific,

1333 S. Chillicothe Road, Aurora, Ohio 44202.

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completed with a buyer referred by the exchange.

The exchange lists any microcomputer hardware that originally sold for between \$400 and \$25,000. The group also publishes a monthly report called the "Used Micro Trends Report" for \$6.75.

The firm is located at 2329 Hunters Woods Plaza, Reston, Va. 22091.



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Series 550 Features DG-Compatible Set

FULLERTON, Calif. — Bytronix Corp. has introduced its Series 550 computer, a system that can accommodate a variety of multiuser operating systems and features a Data General Corp.-compatible instruction set.

Packaged as a single unit, the Series 550 consists of a 16-bit minicomputer, 64K bytes of main memory, a CRT terminal, a disk controller capable of driving the Control Data Corp. (CDC) Model 9455 Lark Module Drive, a printer controller and a second asynchronous port for an additional video display, a spokesman said.

The computer is a companion to the Bytronix Series 500, which can drive two 10M-byte cartridge-type disk drives. However, the CDC Lark provides an 8-in./sec

fixed and removable cartridge combination of 16M bytes of storage with a 9.67 Mhz data transfer rate, the vendor said. Also, the Series 550 is about 550 nsec faster than the Series 500. Both units have the DG-compatible instruction set and include extended instructions for byte-handling, according to the vendor.

A virtual console feature on the 550 allows the user to perform control panel functions via a 73-key keyboard. In addition, the feature allows the user to examine or modify any processor register or memory location through keyboard commands, the vendor claimed.

The Series 550 costs \$4,195, the vendor said from 2701 E. Chapman Ave., Fullerton, Calif. 92631.

Processors Emulate Decsystem-10s, -20s

MOUNTAIN VIEW, Calif. — Foonly, Inc. has announced two additions to its line of Digital Equipment Corp. Decsystem-10-compatible computer systems.

The F4 and F5 are generalized, user-programmable processors that can emulate the Decsystem-10 and -20 family with a three-to-one price performance, the vendor claimed.

The processors can use the DEC PDP-10 instruction set and are capable of running

the Tenex, Tops-10, Tops-20 or other PDP-10 operating systems, the vendor said.

Foonly offers the Model F4 and F5 as complete systems running the Tenex operating system, and it will support other operating systems supplied by the user.

The firm also announced it will offer the C programming language and the Unix operating system, which will be supported by a microcoded architecture. The two processors are equipped with a display-based diagnostic processor that reportedly allows remote hardware and software maintenance.

The F4 costs around \$200,000 and the F5 costs between \$50,000 and \$80,000, the vendor said from 160 S. Whisman Road, Mountain View, Calif. 94041.

Atari 800 Gets Memory System

SUNNYVALE, Calif. — A memory expansion system said to enhance performance of the Atari, Inc. 800 is available from Axlon, Inc.

The standard Axlon 256 with 64K bytes of random-access memory is priced at \$895 from Axlon, Inc., 170 N. Wolfe Road, Sunnyvale, Calif. 94086.

Centronics Introduces Small Business Printer

HUDSON, N.H. — Centronics Data Computer Corp. has announced the Model 739 small business computer printer that produces correspondence printing for text and data processing plus graphics designed to meet the needs of the small user.

Standard features include pin-addressable graphics with a resolution of 74 dot/in. horizontally by 72 dot/in. vertically, a monospaced print speed of 100 char./sec. and an acoustical top cover that provides improved single-sheet paper loading and minimizes the average printer noise level.

er noise level.

The Model 739 prints 7-by-8 dot matrix characters with true underline at 10- and 16.5 char./in for standard data processing tasks and generates an N-by-9 dot matrix proportional characters with true descenders for text editing applications. Under manual or software control, the printer performs half-line steps, both forward and reverse, to create superscript and subscripts, according to the vendor.

The unit costs approximately \$1,000, the vendor said from Hudson, N.H. 03051

Bank Builds Apple Data Base

(Continued from Page 59) so that it took up less than half the storage space it would normally require.

Community First purchased a similar system from Noble, including the necessary hardware, the commodity data base and his software.

"The purchase of existing technology was more advantageous to us than building our system from scratch," she said.

"We supplied the bank with a data base of what's happened to these commodities in the past six to 11 years, along with software that, at the end of the day, automatically updates what's happened during the day on all commodities," Noble explained.

"We also sold them evaluation programs for computing moving averages, basic analytical programs and so on." Later, the bank adapted the SOCS data base to its own analytical software, he added.

The data base and software, described by marketing expert Zachary as being "the best system of its kind in the country," take up the entire 10M bytes of storage area on the Corvus disk.

In investigating other vendor sources and equipment alternatives, Community First was quoted prices up to \$1 million to do what it is reportedly doing for less than

\$100,000 with the Corvus system, Zachary claimed.

As a safety measure, the bank acquired a power backup for the disk and one Apple microcomputer.

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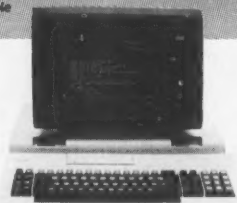
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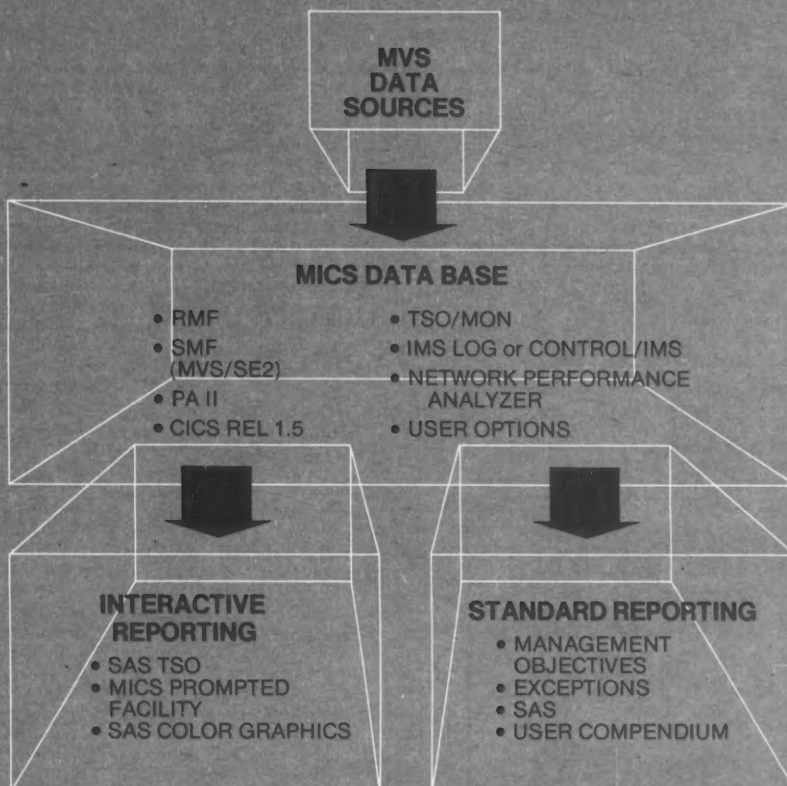
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National Semi Has 256K Card For PDP, VAX

SANTA CLARA, Calif. — National Semiconductor Corp. has announced a 256K-byte, board-level, add-in memory card that plugs directly into a Digital Equipment Corp. VAX-11/750 memory backplane or the PDP-11/70 MK-11 MOS memory backplane.

The memory board is reportedly fully compatible with the PDP-11/70 and VAX-11/750 without need for modifications. Called the NNS70/75, the memory card can be electronically removed from the backplane via an on/off-line switch, the firm said.

By switching off-line, the memory card will be completely transparent to any system diagnostics performed. When battery backup is used, the NNS70/75 will retain stored data while in either an on-line or off-line mode, the vendor said.

The NNS70/75 costs \$2,250 for the fully populated 256K-byte version. It costs \$1,340 for the depopulated 64K-byte version, the vendor said from 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Micro System Backs 255 Users

MOUNTAIN VIEW, Calif. — A multiuser computer system featuring Z80-based microprocessor functions and disk storage expandable to 600M bytes of memory has been announced by Access Matrix Corp.

The basic System 8030 node has a single-user workstation with 64K bytes of random-access memory and two serial ports. Individual users can communicate on a high-speed bus to shared resources, including a 30M-byte disk drive and a 132-col printer, the company said.

System nodes can also be interconnected to provide system expansion to 255 users, with nodes locatable up to 500 meters from each other, the vendor claimed.

The basic 8030 system for a single user workstation is priced at \$29,950, and a fully extended 16-user workstation configuration at less than \$5,000 per node from Access Matrix Corp., 1708 Stierlin Road, Mountain View, Calif. 94043.

SMS Turnkey Out For Hospital Use

KING OF PRUSSIA, Pa. — Shared Medical Systems (SMS) has introduced Med-Verse, a turnkey system that is targeted for use in all hospitals, including those not using systems from SMS.

Med-Verse consists of five modules: word processing, data validation, communications and integration, departmental tasks and advanced administrative functions. Each workstation has a dedicated CRT terminal, and up to 32 workstations can be used, the firm said.

The turnkey system can be used to create on-line, real-time departmental functions, the firm said.

Med-Verse prices begin at \$300 to \$500 per workstation from 650 Park Ave., King of Prussia, Pa. 19406.

Memory Fits PDP-11/34

IRVINE, Calif. — Able Computer has announced Enable/34, a memory expansion for Digital Equipment Corp.'s PDP-11/34, that offers up to 4M bytes of additional main memory in RSTS/E systems.

The device can be implemented by an RSTS/E autopatch procedure, which is supported by the vendor. An on-board LED display provides address, DMA activity and Enable control operating information, according to the vendor.

Enable/34 consists of the Enable control, a bus isolator, unbundled software and an optional cache memory. Enable Control is a modified hex-width board that reportedly installs in the second slot of any DD11-CK or DD11-DK system and is connected to the processor by standard Unibus cable.

The bus isolator is a modified dual-width board that gives the user the option of using up to 256K bytes of existing 18-bit addressable memory. The optional cache memory is a quad-width board that installs in the first quad SPC slot of the Enable/34 backplane, the vendor said.

Prerequisites for Enable/34 are an installed PDP-11/34 and RSTS/E version 7. Users must be able to perform a system generation and to install software patches and drivers, the vendor said.

Enable/34 costs \$6,000 from 1751 Langley Ave., Irvine, Calif. 92714

Coupler Runs With DG Minis

EDEN PRAIRIE, Minn. — Custom Systems, Inc. has announced a magnetic tape drive coupler that integrates independent streamer drives with Data General Corp. Nova and Eclipse minicomputers.

Called the Model 130, the unit can be used in conjunction with streamer tape drives that can be used on DG systems. The vendor claimed its coupler will give better performance than DG's 6125 tape subsystem.

Features include true 100 in./sec streaming, data rates up to 160K bit/sec, disk image backup with DG Burst or PCopy utilizes (20M bytes in 110 nsec), operation with unmodified Rdos or AOS operating system and compatibility with NRZI/PE start/stop tape drives, the vendor said.

The unit costs \$1,490 from 6850 Shady Oak Road, Eden Prairie, Minn. 55344.

HP 1000-L Memory Now One Cent/Byte

PALO ALTO, Calif. — Hewlett-Packard Co. has announced that semiconductor main memory prices for the HP 1000 L-Series microcomputers have dropped to less than one cent per byte.

The price of the 512K-byte memory for the series is now \$5,000, lowering the series two-board, .5M-byte microcomputer from \$13,800 to \$6,250, the company said.

Hewlett-Packard Co. is located at 1501 Page Mill Road, Palo Alto, Calif. 94304.



Source 2's field offices receive buyer inquiries and respond immediately with parts availability and pricing.

Real-Time Service Matches Components Supply, Demand

By Marcia Blumenthal
CW Staff

SANTA CLARA, Calif. — Computer equipment manufacturers often plagued by surpluses and shortages of integrated circuits and other components can now trade these commodities on the International Component Exchange, a real-time computer-based service started here recently by Source 2 International, Inc.

More than 150 electronic equipment manufacturers — including Honeywell, Inc., Xerox Corp. and Exxon Corp. — have been listed on the exchange so far. By the end of the year, 1,000 vendors will become members of the exchange, Source 2 President Robert A. Solomon said, noting that some 13,000 companies worldwide are candidates for the exchange.

The computerized exchange operates like a stock exchange, but Source 2 does not broker sales directly for listed members. Rather, the International Component Exchange allows buyers access to a real-time data base for their parts requirements. The seller has full control over the pricing of specific components.

Once a buyer finds the required part, Source 2 puts him in touch with the seller and the two parties negotiate their own deal. The parties may negotiate the price

listed on the exchange to whatever level they like.

Listing on the exchange is free of charge, but when a deal is struck the seller pays a 10% commission to Source 2. The inven-

(Continued on Page 64)

Programs Coded In Four Months

SANTA CLARA, Calif. — The 100 programs used with its International Component Exchange took four Source 2 International, Inc. programmers only four months to develop, according to Kirk Jensen, vice-president of systems.

The exchange, which began operating in April, offers buyers and sellers of integrated circuits and other electronic and mechanical components used in electronic equipment a quick way to get their surpluses on the market or to buy needed components.

The data base used in the exchange is Cullinane Database Systems, Inc.'s IDMS running in an IBM CICS environment. The 100 programs were developed in

(Continued on Page 64)

Senators Propose Plan to Promote Services Sectors Outside the U.S.

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Recognizing the growing importance to the U.S. economy of telecommunications, data processing and other service sectors, two U.S. senators are proposing a special Commerce Department program to promote American service industries.

The legislative proposal by Senators Daniel Inouye (D-Hawaii) and Larry Pressler (R-S.D.) would augment a related White House plan announced recently by U.S. Special Trade Representative Bill Brock [CW; May 11].

Covering all service sectors, from transportation and insurance to "the most technologically progressive industries," such as DP and telecommunications, Inouye said the Commerce program would be aimed at preserving the competitiveness of U.S. businesses in international trade.

The Commerce Department would be charged with establishing promotional programs and improving the data collection efforts of the department as they relate to service industries, Inouye said in introducing the legislation May 20.

Few Weapons

Noting service industries have "very few legal or administrative weapons to retaliate against foreign countries which erect trade barriers against our service exports," Inouye said the department would provide support for the trade representative in his efforts to maintain the American share of international service markets.

According to information developed at Senate hearings late last year, the U.S. share of those international markets is steadily declining, dropping from 25% to 20% over the last decade.

Declaring "services are the sinews and nerves of commerce and trade," Inouye said the Commerce Department would, under his proposal, be committed to reversing that trend.

One of the primary roles of the department would be to collect comparative international information, conduct a program of research and analysis of service-related issues and programs and

(Continued on Page 64)

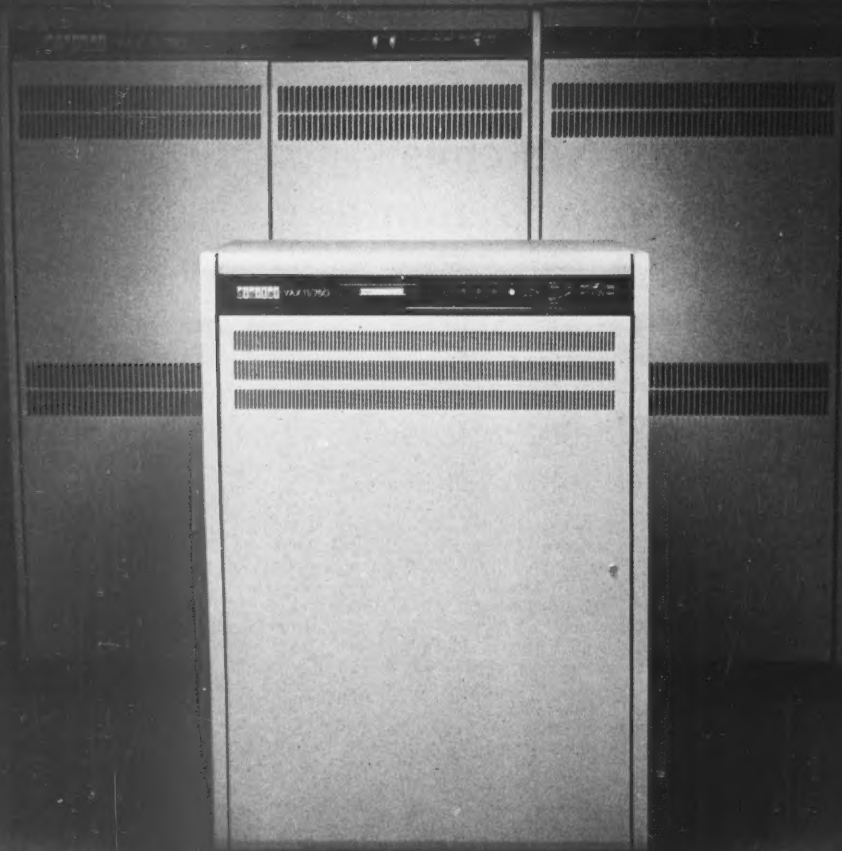
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Every VAX language shares the same symbolic debugger and Common Runtime Library. You can even mix different language routines within a single program. Which means you can optimize every line of your software, because you always get to work with the language you want.

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And because the future of computers lies in communications, Digital has equipped VAX with some of the most extensive networking options in the industry.

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That network, in turn, can be linked to other computers you may already be using, through 2780, 3780, and MUX200 batch bisync, as well as 3271 interactive bisync.

You can even merge two VAX systems with a high-speed data link that effectively makes them a single super minicomputer.

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Exchange Service Aimed at Electronics Vendors

(Continued from Page 63)

tory of surplus parts is automatically updated as parts are sold.

The exchange currently lists prices for 125,000 manufacturers' integrated circuit parts numbers, many of which are cross-referenced according to potential substitutes; this maximizes the chances of a buyer finding an acceptable part and a seller disposing of excess inventory, Solomon

explained. Both electrical and mechanical parts used in the manufacture of electronic equipment are listed.

Access to the data base is through terminals located in Source 2 field offices. Transmission is made via satellite and microwave.

Source 2 currently has two field offices, one in Santa Clara and one in Irvine, Calif. A Burlington, Mass., of-

fice was scheduled to open today; a Roseland, N.J., office will open on July 1 and another location in Chicago will be in operation Oct. 1.

Excess Parts

"Some of the largest blue-chip manufacturers often have \$1 million in excess parts," Solomon said. If worldwide surpluses were tallied, he estimated, upwards of \$50 billion worth of excess parts may be found worldwide — and if those parts were disposed of, they would bring in 10 cents on the dollar from brokers and scrap dealers.

Manufacturers often order 100,000

units of a part, only to find that after using 30,000 units, another part with a better design becomes available on the market. In other cases purchasing managers order more parts than are necessary because they are unable to project part losses. Whatever the reason, manufacturers often find themselves with sizable surpluses.

On the demand side, other manufacturers, usually smaller companies, have shortages.

Source 2 was financed by \$1.7 million in venture capital raised by the firm in about nine weeks. It is headquartered at 3920 Freedom Circle, Santa Clara, Calif. 95050.

Commerce Program Proposed

(Continued from Page 63)

provide information to other agencies, industry and state and local governments.

Other Commerce tasks under the plan would be to:

- Develop a data base for policy-making pertaining to services.
- Analyze tax treatment of services, with particular emphasis on the effect of U.S. taxation on international competitiveness of U.S. firms.
- Analyze antitrust policies as they affect those firms' competitiveness.
- Document trade impediments to U.S. service companies and seek resolution of those companies' complaints.
- Conduct a program of research

and analysis of related issues and problems, including forecasts and industrial strategies.

Pressler said "I believe the reason service industries have been overlooked by federal planners is that most of our economic projections are still based on the premise that manufacturing comprises the bulk of our economic activity."

On the contrary, the bill's sponsors said, seven out of 10 working Americans are employed in service industries, which account for about 65% of the U.S. gross national product.

Despite the sector's steady growth, Pressler said it is stagnating relative to service industries of other countries.

Programs Up in Four Months

(Continued from Page 63)

Exec-Level Cobol in an interactive mode, using normal, structured methodology, but each of the programmers has about 10 years' experience, Jensen said, attributing the quick turnaround of the system to their efficiency and experience.

Ten people work full time entering parts numbers — the critical data contained in the system. The total number of components in use today is about one million, and "we will

have them all in the data base," probably within a year, Jensen said. About 50,000 to 100,000 parts are added to the data base monthly.

The processor used with the system is a Magnuson Computer Systems, Inc. M80/32 with 3M bytes of main storage and three channels running under IBM's OS/VS1 Interact 1. The system already has 2.5G bytes of on-line storage, and Source 2 will add about 1G bytes every three months for the near term, Jensen said.

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AEA Supports Two Bills Asking Tax Aid for R&D

WASHINGTON, D.C. — The American Electronics Association (AEA) and representatives of several other computer and electronics firms and associations recently testified here before the Senate Finance Committee in favor of two bills that would provide tax incentives for research and development activities.

The first bill is S. 692, the Research Revitalization Act of 1981, and would allow a 25% tax credit for corporate funds contributed to colleges and universities for basic research.

The second bill, S. 98, would permit a similar credit for increases in industrial R&D spending over the average annual R&D outlays companies made in the prior three years of operation.

Industry representatives told the Senate committee that technological achievement requires both freedom and incentives for inventors and said that tax policy is the most powerful instrument in the hands of the federal government for fostering technological innovation.

R&D expenditures have been on a steady decline, falling from an annu-

al growth of 7.2% during the 1950s and 1960s to 3.3% during the 1973-1978 period, according to testimony given before the committee.

Japan, Germany

In Japan, industries with high potential are granted R&D subsidies, accelerated depreciation, soft loans and are permitted a 20% tax credit for R&D increases. In West Germany, low-interest loans, tax-free cash grants and special depreciation allowances are made to industry for R&D.

Nearly all government R&D subsidies go to commercial and civilian activities in those countries, whereas in the U.S. more than 60% of government R&D spending goes to defense and space projects, which on the whole do not have commercial applications, testimony noted.

Some of those taking part in the panel included John Nesheim, treasurer of National Semiconductor Corp., representing the Semiconductor Industry Association and Gerald K. Howard, vice-president of Sperry Corp.

United Telecommunications Inks Agreement to Acquire Megatek

KANSAS CITY, Mo. — The signing of an agreement in principle for the acquisition of Megatek Corp. by United Telecommunications, Inc. has been announced by the two companies.

Paul H. Henson, chairman of United, said the acquisition, in which 1.3 million shares of United's stock would be exchanged for 1 million shares of Megatek, is subject to the approval of the latter's shareholders.

He added that Megatek would probably be operated as a part of United's computer group. He also said that Megatek's hardware and software products will add essential elements to the company's remote computing strategies of developing "enhanced computer solution" products and services.

Other Moves

Dyatron Corp. has approved a merger with Micomp Data Systems, Inc. of Colorado Springs, Colo. Mi-

comp stockholders will receive 1.5 shares of Dyatron common stock in exchange for one share of Micomp stock.

Mergers/ Acquisitions

All assets of Computek, Inc. have been acquired from General Automation, Inc. The newly financed company will continue to operate under the name of Computek, Inc.

Sun Information Services Co. has executed a letter of intent to acquire the stock of Metropolitan Computer Center, Inc., a data processing firm. The intended purchase will be cash for stock.

Strategic, Inc. has announced the acquisition of substantial assets of Weeks Research Associates of Morgan Hill, Calif.

Burroughs Announces Changes To Continue Decentralization

PAOLI, Pa. — Burroughs Corp. Chairman W. Michael Blumenthal has announced a series of corporate organizational changes that he said are in line with the company's decentralization of operational authority.

Robert J. O'Connell has been named president of the Federal and Special Systems Group, which markets data processing systems and equipment and provides support services to the U.S. government. O'Connell was formerly vice-president of the group.

In conjunction with the reorganiza-

tion, O'Connell announced the appointment of three vice-presidents within the group:

Ronald J. Friedsam, former general manager of the group, has been named vice-president of the Standard Products Division.

Peter J. MacDonald, former general manager of engineering and manufacturing for the group, has been named vice-president of the Special Systems Division.

And William H. Price, former group director of special systems, has been named vice-president of the Automation Systems Division.

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To meet this growing demand for DP equipment, products and services—computer professionals read *Computerworld/Espana* when they look to buy. *Computerworld/Espana* is the only EDP newspaper serving the Spanish data processing market. Modeled after its sister publication *Computerworld*, it is a weekly tabloid with the most up-to-the-minute information for DP professionals and users who need to keep informed on the fastest growing industry in the area.

With a large editorial staff based in both Barcelona and Madrid, *Computerworld/Espana* covers the latest developments in the computer industry including products and services, application stories and new companies entering the market. And *Computerworld/Espana* has more than 6,000 readers who would like to hear from you.

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Federal Gear Five Years Behind Industry

Small Businesses Urged to Pursue U.S. Market

By Eli Chappe
Special to CW

Contract opportunities for small business firms in the U.S. government market are unsurpassed today. The exponentially increasing data

demand and means for effectively transmitting and processing vast quantities of data in a timely mode by all agencies of the federal government ensures the dynamism of this market.

In addition, a recent General Accounting Office (GAO) report said government-owned hardware (and, by inference, software) is at least five years behind the technology employed in private industry.

From a marketing point of view, there are a number of prime targets to aim at — whether or not you are new to government business.

General Services Administration (GSA). This agency of the federal government is charged with the responsibility for procurement of general-purpose automated data processing (ADP) software and supporting services. GSA's Automated Data and Telecommunication Service is the contracting arm for this activity. The service is at 18 and F St. N.W., Washington, D.C. 20405.

There will be forms to fill out and negotiations to undergo. The end result — if you are successful — will be a contract in GSA's Multiple Award Schedule. The contract will not automatically bring you business, but it does, however, confer recognition as an accepted supplier to and entry into all government agencies, military and civilian.

In writing to GSA, also request a copy of Temporary Regulation No. 46, which explains the use of "Small Purchase" procedures (up to \$300,000) and schedule contracts for GSA ADP requirements. (Having a GSA schedule contract provides the machinery for any agency to buy from you).

The armed services. These are the Army, the Navy (including the Marine and the Air Force). The services spend about 75% of the U.S. procurement dollar. Inasmuch as they have requirements that are "peculiar" to their needs, they are not obliged to buy from the GSA schedule — although they can if the equipment or services meet their needs.

There are seven major military activities involved in procurement of ADP equipment, software, maintenance and services. They are:

- Department of the Army, U.S. Army Computer Systems, Selection & Acquisition Agency, Procurement Division, Room 1F665, Pentagon, Washington, D.C.
- Naval Regional Contracting Office, Long Beach, Calif. 90822.
- Air Force Communications Service, Scott Air Force Base, Belleville, Ill. 62226.
- Defense Supply Service—Washington, Room 1D245, Pentagon, Washington, D.C. 20310.

• Department of the Navy, Director, ADP Selection Office, Crystal Mall #4, Washington, D.C. 20376.

• Naval Regional Contracting Office, Building 200, Room 400, Washington Navy Yard, 20374.

• Department of the Air Force, Electronic Systems Division (AFSC), L.G. Hanscom Field, Bedford, Mass. 01731.

• Defense Logistics Agency, Executive Director, Contracting, Contracts Division (Code DLA-PPS), Cameron Station, Alexandria, Va. 22314.

Write to each — attention: Small Business Specialist — and express your desire to become a vendor to the government. Ask for their list of projected "buys" for 1981.

Prime contractors. Under Public Law 95-507, all large government prime contractors must earmark for small businesses an acceptable percentage of the contracts over one-half million dollars for supplies or one million dollars for construction before they can receive their contracts.

There are two simple ways to identify major primes:

- Defense Contracts Administration Services Region (DCASR). This administrative arm of the Department of Defense (DOD) publishes a list of prime contractors in nine regions. Request a copy from each region. Any DOD facility, Small Business Administration (SBA) office or Commerce Department Business Service Center will supply DCASR addresses free. Once you have these lists, write their small business specialist to become a vendor for subcontract work.
- Commerce Business Daily (CBD). See "Marketing Tools" below.

Marketing tools.

- CBD. This is the government's daily Tip Sheet of upcoming contracts and awards made. Cost is \$110/year. CBD is mandatory if you are after government business. All agencies, military and civilian alike, are required to submit information on their intended procurements over \$10,000 to the CBD for publication. Call or write for a bid set if you see an opportunity listed. Also, the daily list of awardees can be an avenue to prime contractor business. The CBD subscription office is: U.S. Department of Commerce, Room 1304, 433 W. Van Buren St., Chicago, Ill. 60607.

• Procurement Automated Source System (Pass). This was established to improve government contracting and subcontracting opportunities for small business vis-a-vis

requests from government agencies and major primes for profiles of potential vendors. Call the nearest SBA office for the one-page application form.

• The small business specialist. By government fiat, each government office — military or civilian — with procurement authority, must employ a small business specialist.

• Unsolicited proposals. If you as the vendor have a unique and/or improved program, service or piece of hardware, and you have met and interested a government buyer in it, you would offer — with his knowledge (and often at his oral request) — to provide him with an "unsolicited proposal." These follow a specific format. For a copy of the format, contact the small business specialist at any major military purchasing office.

The main ingredient in doing government business is persistence.

Chappe is the editor of the newly published "Small Business Directory of Government Contracts," which lists 1,000 small business specialists at military and civilian purchasing offices countrywide. Copies are available from Danbury Press, PO Box 613, Suffern, N.Y. 10901, at \$15 per copy plus 75¢ for postage and handling.

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Supershorts

Emulex Corp. has opened its first international office, located in the UK, and has appointed Michael R. Barclay as director of UK and European operations.

John J. Cullinane, president of Cullinane Database Systems, Inc., has been voted the winner of the Joseph Wasserman Award for 1981. The award is given annually by

the New York Chapter of the EDP Auditors Association for outstanding contributions to the field of EDP auditing.

IBM and Floating Point Systems, Inc. have announced a marketing arrangement that will enable their representatives to propose joint meetings with engineering and scientific data processing users. Under the

arrangement, either IBM or Floating Point Systems representatives may propose and coordinate joint meetings in which equipment alternatives, specifications and solutions can be discussed with users who have array processor requirements.

Modular Computer Systems, Inc. has created business centers within HS

Americas Operations. The Americas Operations will consist of three divisions functionally responsible for sales, service, contracts and finance and administration of their respective geographic areas.

Perkin-Elmer Corp. plans to establish a manufacturing facility in Cork, Ireland, to produce minicomputer sys-

tems. Under the auspices of the Industrial Development Authority of the Republic of Ireland, PE will purchase a 12-acre site for an 80,000 sq-ft building to be used for the manufacturer of the firm's 32-bit minicomputers and related software and peripherals.

The Computer Law Association recently elected Richard L. Bernacchi its president. Bernacchi is a partner in the Los Angeles law firm of Irell & Manella.

NCR Corp. will join the EFT Association, a national, multiindustry group based in Washington, D.C., which advocates the development and use of electronic funds transfer systems.

Cullinane Database Systems, Inc. has awarded \$10,000 to the EDP Auditors Foundation for a research project entitled "Controls and Auditing Methodologies in a Data Base Environment."

Bunker Ramo Corp. has announced a \$10 million capital improvement program to expand and upgrade its market information system for the brokerage industry. The two-year project involves enhancements to equipment in the company's main data center at Trumbull, Conn. and in its remote data centers.

Gathers Software, Inc. of Denver has established a Land Division to offer lease analysis and management services to the oil and natural gas industry.

Rolm Corp.'s Telecommunications Division has been reorganized into two product divisions. An Office Systems Division was formed to develop and produce products for office automation. In addition, a new group organization structure has been established for some marketing and distribution functions.

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Prime, Henco Ink Marketing Pact

NATICK, Mass. — Prime Computer, Inc. and Henco, Inc., have entered into a joint marketing agreement to provide a multiapplication software package to Prime users.

Info, developed by Henco, is fully compatible with all Prime computer systems. As a productivity tool, Info helps nonprogrammers gain efficiency in personal and departmental computing tasks, Prime said.

In addition, DP profession-

als using Info's programming language are able to develop complete applications in one-tenth the time required with Cobol.

Under the terms of the agreement Prime sales representatives will introduce Info to prospects when applicable. Henco will be responsible for direct sales and support of Info to Prime prospects and introduce

Prime systems to potential customers. More than 300 Prime installations currently use Info.

Info is sold and supported by Henco internationally. It is available from Henco for \$10,000 in the U.S. until July 1, at which time the license price will increase to \$14,700. More information is available from Prime at Prime Park, Natick, Mass. 01760.

Pertec To Handle Triumph-Adler DP Market

LOS ANGELES — Triumph-Adler AG, a German-based equipment subsidiary of Volkswagen, has announced organizational changes it said are intended to enhance its expansion into global office products and business systems technology markets.

Pertec Computer Corp., based here, now assumes management responsibility for all phases of Triumph-Adler's data processing systems and peripheral equipment.

Triumph-Adler bought an interest in Pertec Computer Corp. last year.

Ryal R. Poppa, president and chairman of Pertec, will also serve as a member of Adler's management board.

Expansions

Rair Microcomputer Corp. will open its U.S. sales and manufacturing headquarters in a 24,000 sq ft building on June 1. The plant will be located at 4101 Burton Drive, Santa Clara, Calif.

Gandalf Data, Inc. has opened a New England service office for its data communications product line. The office, open 24 hours a day, seven days a week, is at 850 Province Highway, Dedham, Mass.

Autologic, Inc. has leased a 60,000 sq ft plant near its existing plant headquarters and manufacturing facility in Newbury Park, Calif.

Datapoint Corp. has leased a 14,400 sq ft facility in N. Richardson, Texas, for its Advanced Switching Development Center. The address is 1784 Firman Drive, N. Richardson, Texas.

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Executive Corner

- E. Keith Burnett has been named vice-president of government systems at Scientific-Atlanta, Inc.
- Neville R. Griffin has joined Caere Corp. as vice-president of marketing.
- J. Neil Smith has been named vice-president and general manager of Station Business Systems, a division of Control Data Corp.
- Terry L. Johnson has been

appointed vice-president and chief financial officer for Grinnell Systems, Inc.

- Steve Arnaudoff has joined Distributed Logic Corp. as vice-president of international operations.

- Computrend, Inc. has appointed Joseph M. Allen as vice-president of service. Richard L. Mappes has been named vice-president of finance and administration;

John P. McGlone has been named vice-president of sales; Howard Rodenstein has been named vice-president of planning and marketing; Laura A. Saindon has been named director of personnel and Alfred R. Weimer has been appointed vice-president of materials.

- John W. Tomlinson has been appointed general manager at NCR Comten,

Inc., Canada.

- Charles J. Loch has joined Johnston, Brown & Associates Inc. as president and chief executive officer.

- Jo Keil has been named corporate controller of Wyly Corp. and its subsidiary, University Computing Co.

- Charles A. Steinberg, executive vice-president of Ampex Corp., has been appointed to the additional post of chief operating officer.

- Frank E. Peters has been promoted to the position of president of Wabash Tape Corp.

- Randolph G. Richmond has been named president and chief operating officer of Pfizer, Inc.

- Sterling Systems, Inc. has appointed three new vice-presidents: Thomas R. Cross has become group vice-president, Weldon H. Latham has been named vice-president and general counsel, and Edward A. Murphy has been appointed vice-president for commercial services of that company.

- Frank Grau has joined Colonial Data Systems Inc. as vice-president of sales and marketing.

- Jack C. Cannady has been named vice-president of fi-

nance and administration at System Development Corp.

- Ronald Finerty has rejoined Alanthus Corp. as vice-president of leverage lease marketing.

- Kenneth W. Gross has been elected vice-president of service planning and development at RCA Global Communications, Inc.

- Donald Silverman has been named vice-president of engineering at Local Digital Distribution Co.

- Robert F. Wickham has been named vice-president of marketing for Vector Graphic, Inc.

- David J.P. Keane has been appointed vice-president of marketing at Tele-Graphic Computer Systems, Inc.

- Scott Sharpe has been promoted to the newly created post of corporate vice-president of personnel for Computer Sciences Corp.

- Jon A. Burgman has been named vice-president of finance and administration of AM International's bruning division. Thomas Rooney has become vice-president and controller and Ken Campbell has been named director of management information systems at the company.

- William Santore has joined Manufacturing Resources Inc. as vice-president of sales.

- T.T. Deggendorf has been appointed vice-president of production service at SEI Corp.

- Leonard H. Magnuson has been named vice-president of marketing and sales at Centigram Corp.

- Stanley A. Alekna has joined Informatics, Inc.'s equipment division as vice-president of product services.

- Dr. Gilbert Kaskey has been promoted to the newly created position of vice-president of human resources on the president's staff at Sperry Univac.

- A. Donald Grace has been promoted to vice-president/regional manager of Century Computer Services Inc.

- Data General Corp. has announced the election of Frank P. Silkman as senior vice-president and S. Ralph Weftheimer has been named to head the company's general distribution division as general manager.

- Roy D. Gemberling has been appointed vice-president and member of the executive committee at Digilog, Inc.

- Tymshare, Inc. has announced the promotions of A.M. DePietto to vice-president of field services; William W. Peterman to vice-president, general services division; and Stephen Smith to vice-president, business services division.

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City	Station	Channel #	Day	Time
New York	WPIX	11	Saturday	9:00 AM
Chicago	WSNS	44	Tuesday	6:30 PM
Los Angeles	KWHY	22	Saturday	12:00 Noon
San Francisco	KTSF	26	Saturday	9:30 AM
Boston	WXNE	25	Wed.	10:30 PM
Washington, DC	WDCA	20	Saturday	12:00 Mid.
Philadelphia	WTAF	29	Monday	10:30 PM
Dallas/Ft. Worth	KNBN	33	Tuesday	5:30 PM
Detroit	WXON	20	Saturday	10:00 AM
Minneapolis / St. Paul	KMSP	9	Saturday	TBA*
Houston	KHTV	39	Monday	12:00 Mid.
St. Louis	KDNL	30	Sunday	5:30 PM
Atlanta	WANX	46	Tuesday	11:00 PM

*Check local listings for time.

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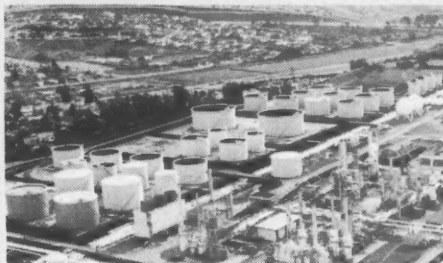
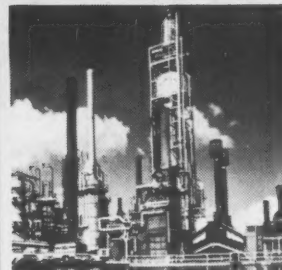
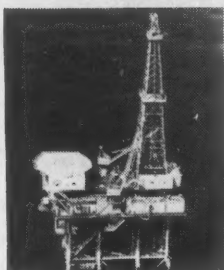
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Arrange a prompt interview by sending confidential resume and salary history to: Ms. Molly De Palma, NCR Corporation, Dept. J54, USDPG, Dayton, Ohio 45479.

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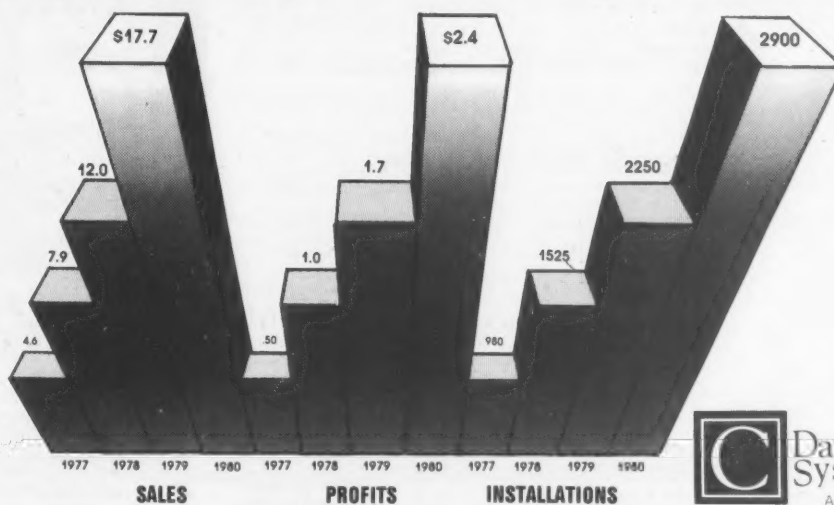
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Provides technical expertise in the development of Pascal based software tools and remote site maintenance software. Interfaces with medium scale scientific computers and advanced microprocessors in a high level structured system implementation environment. BS Computer Science and/or relevant experience.

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Seasoned technical know-how required for the development of new real-time operating system for medium scale computer and advanced microprocessor in a distributed environment. BS Computer Science or equivalent and real time O/S or Language processor background necessary; project planning and Pascal experience desirable.

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The successful candidate will be responsible for coordinating a wide variety of activities associated with the establishment and maintenance of a campus-wide, multi-disciplinary computer graphics facility. Required tasks are the development of various short and long-range computer graphics hardware/software configuration strategies for CAD/CAM, business, scientific mapping and image processing; design and implementation of the computer graphics system documentation and instructional support guidelines; and staff supervision for computer graphics systems support, graphics programming, instructional development and software maintenance. Salary is \$28,700 plus DOE.

A Bachelor of Science in the appropriate discipline required, advance degree desirable. Resumes for the Scientific Programmer II position accepted until June 19, 1981. Reference this advertisement when submitting resume to Arizona State University, Personnel Department, Tempe, Arizona 85281. ASU is an equal opportunity/affirmative action employer.

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Successful candidates for this position will have 5 or more years of intensive analytical and/or project management experience; BS or advanced degree in computer science, industrial engineering or related field is required. Emphasis will be given to hands-on familiarity with manufacturing control systems, including real-time production control with process control interfaces. In-depth knowledge of COBOL and FORTRAN is essential.

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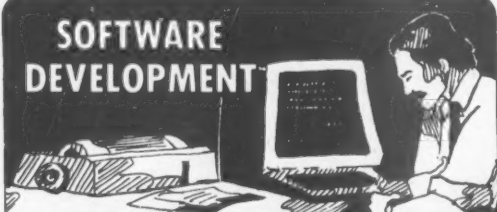


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4 yrs High School or equivalent required. Must have knowledge of COBOL. Must have some experience as Senior Systems Analyst or Project Leader. 4 yrs or 4 yrs as System Analyst experience necessary. Design & implement computer systems related to financial institutions. Consults with managerial & programming personnel to clarify program intent. Divides up program assignments. Analyzes test runs & directs any necessary corrections, using COBOL language. Also reviews programs to increase efficiency & conserve storage space. \$29,192/yr to work 35 hrs/5 days/wk. Please send resumes to: Atlantic Information Systems, Inc., 833 Third Ave., New York, NY, 10007.

SOFTWARE ENGINEERS / EDP MGMT / SYSTEMS ANALYSTS / PROGRAMMERS, \$17,500-\$57,000. Mpls, Midwest & National listings. Send resume to EDP Specialist, J. R. Shoemaker, ABC EMPLOYMENT SERVICE, 401 2nd Ave. S., Minneapolis, MN 55401 (612/339-1453) (Collect). (Highest Quality of Work) **PROGRAMMERS / SYSTEMS ANALYSTS**, \$18,000-\$50,000+. Choice positions available in Pennsylvania & national locations. We have been placing EDP personnel for more than 15 years. Reply in strict confidence to Ann Scates, WEIR PERSONNEL SERVICES, 535 Court Street, Reading, PA 19603 (215/376-5486).

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Full time and permanent. Bachelors in computer science or related field. Two years computer related work in industry. Some recent teaching experience at the college level. Valid CCG Credential. Final filling date 6-28-81 at 5 p.m. Contact Sierra College Personnel Department, 5000 Rocklin Road, Rocklin, CA 95677 or phone (916) 624-3333 Ext. 302 EOE.

Our Travelers Cheque Division Is Doing A Little Traveling.



The Systems and Data Processing Department of our Travelers Cheque Division is headed west. Due west, to the great, open expanses of Salt Lake City!

Our growth rate has necessitated several major, new computer and communications systems enhancements which will make ours the most advanced communications/operations center in the industry. Changes of this magnitude necessitate building a totally new facility, and Salt Lake City, with its unique blend of cultural, recreational and educational facilities, has been chosen.

The priority of this new center will be meeting customers' needs more quickly, more effectively. Consequently, approximately 80% of the projects will be developmental in nature. The primary functions of the Systems and Data Processing Department will be systems development, IMS data base administration, advanced technology, systems assurance and planning, computer operations and technical support in a 303X, MVS/SP, IMS, DB/DC environment. To successfully carry out these responsibilities, we'll need developmentally-oriented data processing professionals who enjoy the challenge of implementing new technologies. Some positions will initially be based in New York City, with relocation to Salt Lake City mid-1982. Specifically, we're looking for:

- PROGRAMMING SYSTEMS CONSULTANTS
- PROJECT LEADERS
- SYSTEMS ASSURANCE PROFESSIONALS
- DATA BASE SPECIALISTS
- SYSTEMS ANALYSTS
- PROGRAMMER/ANALYSTS
- SOFTWARE PROGRAMMERS

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Los Angeles, CA 90076

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Data Image is looking for people with experience in:

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- TDS
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- GRTS

SUNBELT LOCATION

data image CORPORATION

R. L. Bras P.O. Box 1810
Albuquerque, N.M. 87103
(505) 821 9425

PROGRAMMER

The Academic Computing Center, James Madison University, seeks an experienced Programmer to work in support of instructional and research needs. Candidates should have a minimum of 1 to 3 years experience in FORTRAN and BASIC. Knowledge of COBOL, PASCAL, IBM JCL and Statistical Packages (SPSS, SAS) needed. Experience with graphics is highly desired. HP3000 experience and a background in an academic environment is preferred. Position provides a high level of user interface with both students and faculty. Some operations support will be required. To begin July 1, 1981. Salary range is \$15,991 to \$21,844. Submit application or resume by June 15 to Personnel Office, James Madison University, Harrisonburg, VA 22807. An Equal Opportunity Employer

Your Ultimate Choice

PROCESS APPLICATION SPECIALISTS

PUT \$50,000 IN THE BANK NEXT YEAR THEN TAKE A SIX WEEK VACATION

Sound impossible in these days of inflation and recession? Quite the contrary. M. David Lowe has been retained to staff the largest start-up data processing shop in computer science history. The 1985 hardware plan calls for four IBM 3081 equivalents and one super computer.

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- ... More net pay than you currently gross (tax protected).
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For further information, please contact Ron Timm at our Downtown office at (713) 658-9898 or Ada Edwards at our Greenspoint office at (713) 445-6464.

ALL FEES ASSUMED BY CLIENT COMPANIES

M. David Lowe
PERSONNEL SERVICES

478 Houston Natural Gas Bldg.
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Houston, Texas 77002

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First Data: The "Last Word" in State-of-the-art Technology and we'll give you \$2,000 to prove it!

First Data Resources, Inc., a growing subsidiary of American Express, enjoys leadership status in the credit card processing industry due to its advanced features and profit-generating, bottom-line results. With clients in a myriad of business and financial fields both domestically and internationally, our services are increasingly in demand.

This growing demand has created key positions for experienced professionals. And, we are so certain that you'll agree we offer some of the finest opportunities in the industry, we will give you a \$2,000 employment bonus if you are hired for any of the following positions.

ON-LINE PROGRAMMERS

We're seeking professionals with 1-5 years experience using BAL in CICS/OS environment. Implement and maintain on-line operations software relating to general finance reporting. Exposure to large IBM compatible CPUs and peripherals a plus.

MVS SYSTEMS PROGRAMMERS

We're looking for individuals with experience in the generation and maintenance of MVS operating systems, JES2 or CICS for large IBM and AMDAHL CPUs. Experience should include SMP4, SCP problem determination, monitoring and tuning. Familiarity with maintenance and operation of ACF/VTAM and ACF/NCP are a plus, but not required.

APPLICATIONS PROGRAMMERS & PROGRAMMER ANALYSTS

A thorough knowledge of COBOL and 1-3 years experience is required. Exposure to BAL and OS preferred but not essential.

TEAM LEADER

First line supervisory position, directly responsible for one or more sub-systems, manhour projects, cost estimates and the coordination of all projects through your team of 5 professionals. You will require at least 4-5 years programming and analysis experience with an excellent working knowledge of COBOL and previous supervisory experience in a DP environment. Knowledge of IBM OS is helpful. Exceptional oral and written communications skills are essential since you will be interfacing with people at all levels.

These positions offer top salaries, benefits, and relocation allowances along with the opportunity to grow professionally in a dynamic environment, and grow personally in Omaha... one of the most progressive areas in the country. Qualified applicants can call Mr. John Mackey at (402) 399-3866 COLLECT, or send him your resume in complete confidence.



FIRST DATA RESOURCES, INC.

Box 101
7301 Pacific Street
Omaha, Nebraska 68114

An Equal Opportunity Employer M/F
No agency referred applicants accepted.

SYSTEMS PROFESSIONALS... ADVANCE YOUR CAREER WITH A DYNAMIC LEADER!

The growth of our \$1.5 billion company with over 1,100 retail outlets serving the Southern United States has created career opportunities at our corporate computer center located on Florida's West Coast. To maintain our leadership role in our industry, we are seeking skilled Professionals for the following positions:

SR. SYSTEMS ANALYST

Requires 5 or more years experience as a Systems Analyst. Retail inventory control experience preferred. Knowledge of COBOL, TSO, SP, as well as excellent communication skills a must.

PROGRAMMER ANALYST

The successful candidate will have 3 or more years experience working with COBOL, TSO and SP. Retail orientation and POS experience preferred.

PROGRAMMER

Candidates should have two or more years experience in COBOL, MVS, TSO and SP. Retail orientation a plus. We offer both Professional rewards and personal satisfaction as you work with state-of-the-art equipment in pleasant surroundings. Competitive compensation and benefits package included. Send complete resume, including salary history, to:

Headquarters
Personnel Manager

**ECKERD
DRUG COMPANY**
P.O. Box 4689
Clearwater, Florida 33518

An Equal Opportunity Employer M/F

PHILADELPHIA

SYSTEMS ANALYST TO 30K

CC Philadelphia Insurance company requires minimum 5 years life insurance applications to collect, analyze, and project related data. Must have ability to read COBOL, and have excellent communication skills to interpret and relate information to management. Requires experience in translating functional specs. into systems and programming specs. Knowledge of billing and collections, loans, NFO options necessary. Degree preferred. Excellent Benefits.

(ALWAYS PEE PAID)
CONTACT: Bob Greenberg

ROBERT HALF
OF PHILADELPHIA, INC.
2000 Market St., Suite 705
Philadelphia, PA 19103
(215) 568-4580

PROGRAMMER/ ANALYST

Exciting opportunity to provide leadership in conversion from Burroughs B-6800 to IBM 4341. B.S., 5 years experience to include IMS/DB/DC required. U.S.U. offers excellent benefits and is located in a prime recreational area. Send resume, three references, salary requirements by June 19, 1981 to: F. Burnett, UMC 37, Utah State University, Logan, Utah 84322. AA/EOE.

INVENTORY CONTROL SPECIALIST

Excellent opportunity for a qualified individual to become associated with a well-established, scheduled airline based in Anchorage. We offer a salary commensurate with experience, excellent benefits, including airline travel privileges. **Qualifications:** 4 years experience in systems design and analysis with programming experience on an IBM 4331, DOS/USE using ANS COBOL, knowledge of CICS, USAM, and structured programming techniques. At least 2 years experience in Inventory Control Systems. Send resume to: **Offices Air Alaska, Data Processing Department, 4190 International Airport Road, Anchorage, Alaska 99502.**

Systems Analyst Medical Division

We are the Research and Development Division of the Revlon Health Care Group, a worldwide group of diversified companies providing products and services in the field of human health.

Our Clinical Information Department, based at our lower Westchester County location, currently has an opening for a Systems Analyst. Responsibilities include data base management, data dictionary, and statistical reports and charts.

Candidates should be college degreed and articulate with 2-3 years programming experience in SAS, FORTRAN, and/or PL/1.

We offer a competitive salary and excellent fringe benefits.

Please send resume, including salary history, in complete confidence to: **Manager, Selection and Placement, Research and Development Division, Dept. 5315, Revlon Health Care Group, Suite 816, 50 Rockefeller Plaza, New York, NY 10020.**

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REVLO Health Care Group

SALES STARS! HAVE YOU RECEIVED AN ICP MILLION DOLLAR \$ SOFTWARE SALES AWARD?

If so, we want you and we'll give you the incentive to join us. We only want the "best".

If you haven't yet achieved this prestigious award, we'll help you, with a superb product line and substantial compensation package.

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Atlantic Software Inc.

320 Walnut St., Philadelphia, PA 19106 (215) 922-7500

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Turn-key Systems and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are \$84.70 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs \$169.40 per insertion. Extra space is available in half-inch increments and costs \$42.35. Box numbers are \$10.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us), WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

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Signature: _____

Name: _____

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Address: _____

Telephone: _____

Send this form to:
CLASSIFIED ADVERTISING, COMPUTERWORLD
375 Cochituate Road, Box 880, Framingham, MA 01701

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SOFTWARE ANALYST

Maine's largest pulp and paper manufacturer has a challenging opportunity in its computer information systems department. This position requires a college degree with a minimum of 4 years systems programming experience on an IBM mainframe. Primary qualifications include DOS/rs and CICS. Background in VM/370, Power, Parvalet, and SNA is desirable. Experience in data communications is an asset.

SYSTEMS ANALYST

Same company located in Maine requires a systems Analyst. The position requires a college degree and a minimum of 5 years experience in systems design and analysis. A command of COBOL computer language and experience with IBM 370 Mainframe, DOS, OS/VS1 and VS/CMS is necessary. Knowledge of BASIC and experience with Digital PDP 11/70 and RSTS/E is desirable.

COMPUTER OPERATOR

An immediate opening for a computer operator exists in the Data Processing Department. The incumbent will be responsible for operating an IBM 370-138 Dos/VS computer. Knowledge of O/S operating system and PDP 11/70 is a plus. Work involves shift rotation.

Excellent salary and benefit plans available. Apply in confidence to Central Personnel, Great Northern Paper Company, Millinocket ME. 04462 by June 3, 1981.

Interviews will be held in the Boston area.



Great Northern Paper
a company of
Great Northern News Corporation

An Equal Opportunity Employer M/F

DATABASE SOFTWARE

Are you an IMS systems support person interested in working in a program-development environment? An opportunity is available to you which includes developing utility and productivity-improving programs in a large data base management system environment, recommending vendor products for installation in several data centers, providing technical consulting services to center support personnel, and modifying and enhancing vendor products including IMS.

Required background includes in-depth knowledge of IMS internal structure with extensive experience in debugging problems in IMS product code and excellent IBM/370 assembler language programming skills. Skill in a high-level language is desirable. Good communications skills are also essential. You will be working in a state-of-the-art environment with project leadership responsibilities. Many opportunities exist in the company to broaden your experience in both operating and online systems in a large tele-processing environment.

We offer an attractive salary, benefits package and relocation assistance. Qualified candidates send your resume with salary history and requirements to:



Sylvia L. Zamecnik
Standard Oil Company (Indiana)
200 E. Randolph Drive
Mail Code MC 0302
Chicago, IL 60601

Equal Opportunity Employer M/F

SOFTWARE ENGINEERING PROS



NATION-WIDE OPENINGS...

Raytheon Service Company's Mid-Atlantic Systems Facility has career opportunities for those software professionals desiring responsibility and growth. Minimum requirements include a degree in Engineering, Math, Physics or Computer Science and at least two years of relevant experience. For those who qualify we offer...

...A MATRIX OF OPPORTUNITY

Application	Location	Hardware	Languages	
Naval Fire Control (real-time)	Mt. Laurel, NJ Dahlgren, VA Oxnard, CA Pascagoula, MS	AN/UYK-7 AN/UYK-20	CMS-2 (Q&Y) ULTRA-32 ULTRA-16	DEFENSE
Sonar Fault Monitoring & Localization (real-time)	Portsmouth, RI	AN/UYK-20 PDP-11 VAX	CMS-2M (MTASS)	
Aircraft Simulation & Analysis	Mt. Laurel, NJ	IBM 370	FORTRAN	INDUSTRIAL
Magnetic Simulation & Analysis	Mt. Laurel, NJ	CYBER 174	FORTRAN	
Energy Monitoring & Control (real-time)	Mt. Laurel, NJ	NS SC/MP M6809 PE 732	ASSEMBLER FORTRAN	
Integrated Logistics Support	Mt. Laurel, NJ Baltimore, MD Greenbelt, MD	PE 3220	DMS COBOL RELIANCE	

If you feel that you qualify for one of these challenging positions and want to be treated like the professional you truly are, please send your resume in the strictest confidence to Mrs. Schwartz (Code 681), at the address below. Direct applicants given preference.

RAYTHEON

an equal opportunity employer

RAYTHEON COMPANY

RAYTHEON SERVICE COMPANY

Mid-Atlantic Systems Facility
305 Fellowship Road
Mount Laurel, New Jersey 08054

Excellence in Software for High Technology Applications

TIRED OF THE BIG CITY?

The Renovator's Supply, Inc. is a national mail order supplier of high-quality, old-style lighting, plumbing and hardware supplies located in the beautiful Berkshire hills of Western Massachusetts. We are seeking a programmer analyst with at least 3 years programming plus 3 years system design experience for design and implementation of COBAL/EDL programs on IBM series 1 equipment. Candidates must be highly self-motivated. Tremendous advancement possibilities due to our continued rapid growth. Salary range \$25,000-\$30,000. Please send complete resume and salary history to:

Claude Jenette
The Renovator's Supply, Inc.
Millers Falls, MA 01349
(617) 858-3185, 858-3141

INDEPENDENT COMPUTER CONSULTANTS

Immediate assignments in NYC, Westchester, Conn., N.J., & L.I., for someone with exp in any of the following:

RAMIS - PL/1
NCR Neat B6700 ALGOL

For further information, call Maggie Liptak at 212-684-6540, or submit resume to: Interface, Inc., 17 West 54 St., NY, NY 10019.



DATA PROCESSING OPERATIONS MANAGER

WALT DISNEY WORLD CO. has an immediate opening for a Data Processing Operations Manager. Individual will be responsible for planning and management of a computer center along with a sizable communications network.

Qualified candidates will possess a college degree with 4-6 years computer operations management experience in a large size installation; verbal and written communication skills are essential.

Interested candidates should send resumes, including salary history, in confidence, to:

Walt Disney World Co.
Professional Staffing MIS-8
P.O. Box 40
Lake Buena Vista, FL 32830

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If you are interested in advertising with Computerworld, but don't know how to do it, give us a call! We'll be glad to send you our current rate card, which explains sizes, costs, deadlines and requirements. Along with that, we'll send you a sample that actually shows examples of ad sizes, typefaces, and prices. Our toll free number of 800-343-8474, in Massachusetts call 879-7000, just ask for Classified Advertising. Or, you can write to us at Computerworld, located in the classified section of Computerworld. Fill it out, attach your ad with a check, and return it to us. We're at 375 Conchitate Rd., Box 890, Framingham, MA 01701. Send us your Classified Advertising. We're glad to help.

Sysorex International Inc.



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Marketing Manager

New Microprocessor/Minicomputer Systems

Bell Laboratories, the research and development unit of the Bell System, is seeking a manager to take broad product and market responsibility for a new microprocessor/microcomputer product line.

The position requires the management of professional personnel in: product and market research; strategic product and market planning; customer liaison and presentations; project coordination; product definition; and business analysis.

The successful applicant should have a background in marketing management involving microprocessor/microcomputer devices, systems and software. A master's degree in Electrical Engineering or Computer Science, plus MBA, is preferred.

This position is at our modern Holmdel laboratory in central New Jersey where outstanding technical support and the finest computing facilities are available.

Bell Laboratories offers an outstanding salary and benefits package.

A written response is required. Please send your resume, detailing recent management experience, references, and other pertinent data to: Mr. Rod Parker, Room 3D-355, Dept. 7831-63-A, Bell Laboratories, 600 Mountain Avenue, Murray Hill, New Jersey 07974.



Bell Laboratories

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FORTUNE

NATIONWIDE SPECIALISTS

"COMMUNICATIONS"

Voice/Data Networking - Hardware/Software
Positions Available: \$20 to 40K

"SYSTEMS PROGRAMMERS/TECHNICAL SUPPORT"

Minimum 2 years exp. any IBM Operating Systems
with or without CICS or IMS.
Positions Available: \$25 to 40K

FORTUNE CONSULTANTS OF IRVINE, INC.
19742 Macarthur Blvd., Irvine, Ca. 92715
(714) 851-0311



The International Atomic Energy Agency seeks for its Data Management and Computer Education Group a

"Group Leader"

to plan and administer under the supervision of the Unit Head the efforts of the Agency with regard to data and word processing education and use of data management systems, specifically DATA-MANAGER and ADABAS. Required university degree and at least 4 years supervisory activity and practical experience of data base, data dictionary and word processing. Initial contract two years, tax-free emoluments depending on experience and qualifications approx. US \$32,400 per annum. Additional allowances for dependants. Travel and removal expenses paid. Six weeks annual leave. Send curriculum vitae with an indication of your nationality under VN 8/81 to the Division of Personnel, International Atomic Energy Agency, P.O. Box 100, A-1400 Vienna, Austria.



CHALLENGING CAREER AND BEAUTIFUL LIFESTYLE

Southern Virginia

Tall mountain peaks, lush pine forests and sparkling streams provide a setting of natural beauty for Dominion Bankshares Corporation, a dynamic multi-bank holding company in Virginia. With over 150 statewide offices, Dominion has a record of performance few can match. We offer comprehensive salary and benefits programs, including relocation assistance.

Our Data Processing environment includes: IBM 370/168, 370/158, MVS; 4331, DOS/VSE, a statewide CICS network with connections to several national organizations, VTAM/NCP; ROSCOE; RJE; DEC PDP 11/70, RSTS-E.

If you are the type of person who wants to excel at your profession and, at the same time, live in a beautiful part of the country, please compare your experience to the openings listed.

SYSTEMS PROGRAMMERS

Applicants should possess knowledge of one or more of the above software systems currently in place at DBC. The successful candidates will work in the group responsible for planning, implementing and maintaining these systems. In addition, this group will be performing the following:

- Expansion of the VTAM network
- Performance measurement/capacity planning
- Enhancement to the RJE network (4300's)
- Many aspects of electronics funds transfer
- Continued integration of beneficial functions and features of current and new software

APPLICATIONS DEVELOPMENT

Major activity is underway, including Central Information File (CIF), Deposit Accounting, Cash Management, Commercial Loans and IBM CPCS, DOS Check, 3624.

SYSTEMS ANALYSTS

Requires 5 or more years experience in analysis, design and implementation of banking systems such as CIF, DDA, Charge Card, Commercial Loans or EFT applications.

PROGRAMMER/ANALYSTS

Requirements include 4 or more years experience in one or more of the following: ALC, COBOL, CICS.

If an outstanding company and a great place to live is the combination you've been after, send your resume including current salary to Barry L. O'Donnell, Manager-Staff Placement/Relations.



Dominion Bankshares Corporation

P.O. Box 13327, Roanoke, VA 24040

All Replies Will Be Held In Confidence

An Equal Opportunity Employer M/F/H

SYSTEMS PROGRAMMER

Master's Degree in Computer Science. Must know Z-80 assembly language, Basic & Pascal. Must have experience through education or on-the-job in the development of interpreters for microprocessors. Involved in the development & design of interpreters & systems software for Z-80 and 8085 Microprocessor Computers. \$22,000 per year to work 40 hrs/5 days/wk. Apply to: Monroe Systems for Business, The Great American Road, Morris Plains, N.J., 07960, (201) 840-7972.

DP Manager

Large Apparel Manufacturer
Requires a top-notch pro to supervise and continue to develop a growing department. Mid-town New York. Minimum ten years supervisory experience and apparel background required. Submit resume and salary to:

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Box 880
Framingham, MA 01701

DALLAS

Expanding Burroughs Large System Data Center needs:

Programmers, Systems Analysts, Project Managers

for applications development and technical support.

For more information please forward your resume including salary history and requirements in strict confidence to:

Personnel Director
Computer Health Services, Inc.
2355 Stemmons Fwy., Ste. 1103
Dallas, TX 75207

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career search opportunities

\$18,000-\$60,000

MIS DIRECTOR to \$60,000. Our internationally known financial institution seeks aggressive exp'd DP pro for large telecomm & network system. True state-of-the-art environment. Degree preferred. Refer GR.

SR. ANALYST — COMPUTER TECHNOLOGY — \$45,000 + FULL RELOCATE. This petrochem giant is developing a state-of-the-art teleprocessing network. Familiarity w/latest IBM systems software req'd. High level second language a big help. Client has exceptional benefits including full relocation pkg to beautiful suburban setting. Refer MF.

DIRECTOR OPERATIONS to \$45,000. Major corp. Direct total DP effort/operations, programming/systems design through dept mgrs. Large IBM on-line D/B environment. Large staff mgmt skills. Degreed. Ohio metro. Refer AT.

STATISTICIAN to \$45,000. "Fortune 100" co seeks MS or PhD statistician to develop in-house consulting svc. High visibility corp hdqtrs position. Some travel. Refer JC.

DP CONSULTANT to \$45,000. This is a leading edge oppty for a Health Care DP professional to manage & direct large scale environment. Our international firm seeks degree + computer pro w/ consulting bkgd. High visibility & growth. Refer GR.

COMPUTER SALES to \$40,000. Several clients in the DC area seek 2-5 yrs exp in hardware sales to Government. May consider good Gov't software sales exp. Refer DM.

MGR. SCIENTIFIC SYSTEMS to \$38,000. Major corp./research marketing group direct scientific solutions to complex business problems. Tech staff. O.R./quantitative approach. Report V.P. Research. Advanced degree; Ohio metro. Refer AT.

DESIGN ENGRS. to \$35,000. High visibility opptys for BSEEs or Comp Sci w/minor or micro computer exp for on-line terminal systems dvlpmnt. Attractive suburban New England location. Excellent comp & benefits. Refer JC.

D.B.A., \$33,000. Petro corp needs exp w/DB internals. IMS & CICS. Large 3033 environment. High visibility. Refer RJ.

MGR., SYSTEMS PROG., \$31,000. Need supervisory exp, 5 yrs min in technical area. Prefer large IBM bkgd. Refer RJ.

PROGRAMMER ANALYST to \$28,000. "Fortune 500" corp in Baltimore suburbs seeks degreed COBOL programmer w/large-scale hardware experience. Refer CN.

PROGRAMMER/ANALYST, \$26,000. "Fortune" co needs sharp person to do heavy systems development. Currently using 370/148 OS/VS1 COBOL. Refer RJ.

PROGRAMMER ANALYST to \$20,000. Major U.S. Corp in scenic, low cost Virginia area seeks strong COBOL programmers w/IBM bkgd willing to train in DL-1, CICS. Refer DM.

PROGRAMMER/ANALYST, \$24,000. Petro corp now operating large IBM & D.G. equipment needs strong COBOL exp. Growth oppty. Refer RJ.

CONTACT OUR NEAREST OFFICE ABOUT THESE AND OTHER
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PHILADELPHIA, PA 19108 — R. Romagne, 1500 Chestnut St., 215/761-6300
ATLANTA, GA 30348 — R. Jennings, 47 Parkcenter Center, 404/293-0933
BALTIMORE, MD 21206 — C. Neuman, 409 Washington Ave., 201/286-4500
CHARLOTTE, NC 28202 — L. Stone, 1742 Southern Blvd., 704/375-0600
CLEVELAND, OH 44131 — A. Thomas, 4401 Rockside Road, 216/524-6066
DALLAS, TX 75219 — D. Meier, 1710 Goodridge Drive, 702/760-1335
NEW YORK, NY 10028 — J. Dean, 1211 Ave. of the Americas, 212/640-6930
PITTSBURGH, PA 15222 — B. Sayers, 4 Gateway Center, 412/520-5410
PRINCETON, NJ 08540 — J. Dean, Route 81, CN 6100, 609/452-8135
WILMINGTON, DE 19819 — J. Clark, 2818 Riverside Rd., 302/476-1150
HOUSTON, TX 77088 — G. Smith, 3000 Richmond Ave., 713/523-5588
LOS ANGELES, CA 90017 — A. Jackson, 707 Wilshire Boulevard, 213/623-3001
SAN FRANCISCO, CA 94111 — W. Melchior, 601 Montgomery Street, 415/392-4353
FLORHAM PARK, NJ 07932 — M. Feiger, 248 Columbia Turnpike, 201/966-1571

FOX-MORRIS
personnel consultants

PROGRAMMER ANALYST

If You Are The Best, Why Not Work For The Best?

M.I.S. International, a well-established computer systems organization in its 11th year is seeking ambitious professionals looking for a challenge. We have the following openings at our Corporate Headquarters, as well as Regional Offices in Cleveland (Ohio), Fairfield County (Connecticut) and Rochester (New York):

- Business Systems Programmer/Analysts experienced in IBM and Honeywell computers under GECOS and MULTICS
- Database Programmer/Analysts such as CICS, IMS, etc.
- Real Time Programmers

M.I.S. offers total fringe benefit package and relocation costs when required.

Call James Schweizer at Corporate Headquarters, 1-800-521-2144 or send your resume in confidence to:

MIS
INTERNATIONAL INC.
Corporate Offices
24655 Southfield Road
Southfield, MI 48075
(313) 552-0550

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Equal
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- REAL ESTATE
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It's easy to advertise in COMPUTERWORLD. If you don't have an advertising agency to supply us with copy, layout and order, or a camera ready mechanical, stat or film negative of your ad just call Sue Stevens at 1-800-343-6474. She will be glad to take your ad and typeset it in available fonts at no extra charge. If you have lengthy ads that require logos and artwork, just send a clean typewritten copy of your ad to the classified advertising department at COMPUTERWORLD (telecopier service is available); note the ad size you want; and, if you want your company logo to appear in your ad, please be sure to include a camera-ready copy with your insertion order. You should also supply any special borders, headlines and artwork that you want in your ad. Our Art Department will follow your suggested layout as closely as possible if you wish to send one.

Ad closing is every
Friday,
10 days prior to
issue date.

Rates: Open rate is \$84.70 per column inch. Columns are 2" wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs \$169.40 per insertion. Additional space is available in half-inch increments. Some sample sizes and costs are shown.

- 1 col x 4" — 338.80
- 2 cols x 4" — 677.60
- 2 cols x 5" — 847.00
- 2 cols x 8" — 1355.20

Discounts are available when you run more than 35 column inches of advertising in a year anywhere in Computerworld. Box Numbers are available. \$10 per insertion.

Ad Closing is every Friday, 6 working days prior to issue date (issues are dated Monday).

To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call our office nearest you.

Boston - (617) 879-0700
New York - (201) 967-1350
Chicago - (312) 827-4433
San Francisco - (415) 421-7330
Los Angeles - (213) 450-7181

TELECOPIER SERVICE -
(617) 879-0700

William J. Mills,
Manager
Classified Advertising



WE'RE LEAVING OUR MARK
ON THE TURN-KEY
COMPUTER INDUSTRY . . .

DISPLAY DATA CORPORATION, with over 1400 customers served by 31 offices throughout the U.S., is a leader in the field of turn-key systems designed to meet the needs of clients in selected but rapidly expanding vertical markets. Our systems, marketed under the trademark "insight", are sought after for the scope and versatility of applications and the ease by which the systems operate for the end-user.

DESIGN ENGINEER

To enhance our leadership role in the industry, we are seeking an exceptional Design Engineer to aid in the refinement of existing hardware and to develop more advanced systems. The individual we seek must have an EE degree, digital design background, and 8085 or related hardware and software design experience. Responsibilities center around taking design from prototype stages through systems integration. This position reports directly to the V.P. of Engineering, and will be based at our Corporate Headquarters in Hunt Valley, Maryland.

The selected candidate will enjoy a generous salary commensurate with experience, a comprehensive benefits package, and opportunities for rapid Professional growth. Paid relocation is also provided.

ARE YOU LOOKING TO LEAVE YOUR MARK, NOT ONLY ON A COMPANY, BUT ON AN INDUSTRY AS WELL? . . . Then we want to talk to you.

If you meet the above qualifications, please send your resume complete with salary history, in confidence, to:

JoAnn Schmidt, Personnel Manager
DISPLAY DATA CORPORATION

Executive Plaza IV
Hunt Valley, Maryland 21031
OR CALL (800) 638-1100
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VICE PRESIDENT-SYSTEMS/PROGRAMMING

This position will provide total responsibility for a sizable Systems and Programming function in a growth oriented organization. Candidates must have 10 to 15 years of solid data processing and management background. Requires substantial experience in project management, structured programming, document standards, etc. Must have good working knowledge of IBM Assembler and Cobol languages, and be experienced in large scale financial system design and implementation.

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A minimum of 3 years experience in technical computer systems development utilizing large scale IBM computer systems, preferably in oil, gas or chemical industries, required in addition to a degree in Engineering. An advanced degree in Engineering or MBA highly desirable. Computer modeling and simulation in a scientific or engineering environment preferred. Supervisory and project leadership skills and project life cycle methodology experience a definite plus. Similar positions are available in our corporate headquarters in Houston, Texas.

CIG provides a generous company paid benefits package (with dental available) in addition to long range job stability and career growth. Salary commensurate with experience. For immediate consideration please send your detailed resume, complete with salary requirements, to Employment Department, Section 58, COLORADO INTERSTATE GAS COMPANY, P.O. Box 1087, Colorado Springs, CO 80944. We are an equal opportunity employer m/f/v/h.



Colorado Interstate
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SYSTEMS ANALYSTS will work with users at all levels in the expansion of existing projects and the creation of new applications. Successful candidates will have 2 or more years of solid business experience and some combination of the following attributes:

- Bachelor's degree preferred.
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- On-line or distributed processing experience.

PROGRAMMERS will work with systems analysts to develop new manufacturing and accounting applications and participate in problem solving sessions. Ideal candidates will have one or more years of programming experience, a college degree or equivalent and exposure to some combination of the following:

- ANS COBOL with VSAM.
- DBMS preferably DL/I.
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- On-line entry CICS - VS or DMS.

We offer an excellent salary complemented by an outstanding benefit package. Please forward resume with salary history, in complete confidence, to K.B. Hawkins, Personnel Department.

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A challenging position available for a qualified Programmer/Analyst for our Bank Data Processing Service Center. Candidates should have 2+ years of Assembler programming experience on a large scale IBM OS System. CICS and DOS experience is a definite plus. Must have a banking background experience, preferably in deposit application. We offer an attractive compensation package. Please forward resume and salary requirements to:

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CENTRAL BANK OF TRINIDAD AND TOBAGO CAREER OPPORTUNITIES

The Central Bank of Trinidad and Tobago is in the process of computerizing the operations of the Bank and Stock Exchange and invites applications from suitably qualified individuals to fill the following positions:

SYSTEMS PROGRAMMER

Candidates should have a Bachelor's degree in Computer Science with preferably a minimum of three (3) years experience in IBM Systems, one (1) year in DOS/VSE with CICS/VS, DL/I, COBOL and Assembler knowledge.

SYSTEMS ANALYST/SENIOR SYSTEMS ANALYST

A recognized university degree preferably majoring in Computer Sciences, Business Administration or Statistics. A minimum of three (3) years experience in Systems Analysis and Design with at least two (2) years in the use of DL/I, COBOL, DMS/OMS and CICS. Preference will be given to persons who have implemented banking systems. Persons with greater experience will be considered for the position of Senior Systems Analyst.

PROGRAMMER/SENIOR PROGRAMMER

At least five (5) 'O' Levels, one of which must be mathematics or a High School Diploma with a minimum of three (3) years programming experience in DL/I, COBOL and FORTRAN, VSE/ICCF or VM/CMS and CICS/VS within a banking/financial environment. Persons with greater experience will be considered for the position of Senior Programmer.

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At least five (5) 'O' Levels or its equivalent. A minimum of three (3) years experience operating in a DL/I, CICS/VS, DOS/VS or DOS/VSE and VM/370 environment.

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Trinidad and Tobago
331-3 Graybar Building
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Closing date — June 30, 1981

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We have an opportunity for a Proven Systems Analyst to join our Data Processing Team in a position of high visibility and responsibility. This individual will be highly involved with the implementation of the IBM patient care system (PCS) in our health center utilizing DL/I and CICS on our IBM 4331 system. We will pay the individual selected an attractive salary and offer outstanding benefits package including a full month paid vacation and a liberal retirement annuity plan. KOOM - KOHC is a team of people learning, working, growing and serving together. For more information send your resume to:

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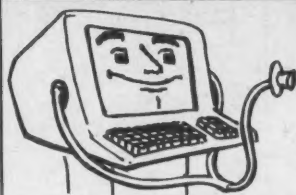
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Programmer

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Applicants should have at least 2-5 years' experience in development and support of systems software utilizing BAL on Univac 90/80 or IBM 370/OS. Degree in Math, Computer Science, or Engineering strongly preferred.

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This opportunity offers excellent salary and company benefits. If you are interested, please send a resume to: Steve Kvance, Schlumberger-Doll Research, P.O. 307, Ridgefield, CT 06877.

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Schlumberger

Senior Programmer

Position currently available with a leading clothing manufacturer for a Senior Programmer to write and test computer programs using complex, batch, on-line and data base techniques. This will require modification of existing programs, preparing flow charts, record formats, program documentation and run instructions. Incumbent will also assist operations in resolving program production problems and provide assistance in the preparation of JCL, string and parallel testing.

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Personnel Department (258-29)
Physical Science Laboratory/NMSU
Box 3-PSL
Las Cruces, New Mexico 88003

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Physical Sciences Laboratory

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Faculty tenure track position beginning mid-August 1981, for individual to teach all levels of Data Processing courses including COBOL, RPG, FORTRAN, BASIC, Systems Design and Operating Systems. Master's degree and some business data processing experience preferred. Some teaching experience also preferred. Salary is commensurate with qualifications and experience. Respond in writing by June 15, 1981 to: Behavioral, Business, Education and Social Sciences Division, Community College of Allegheny County, South Campus, 1750 Cleverly Rd., Box 988, W. Salem, PA 15122. Affirmative Action Employer

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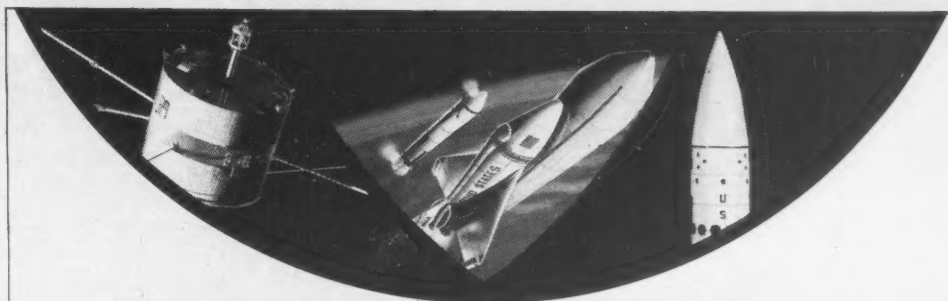
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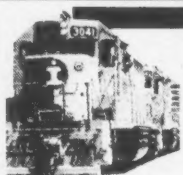
software analysis requirements, and design and test, using government specifications. U.S. Citizenship and active clearances are required.

If you qualify for these challenging positions, send your resume to: Martin Marietta Denver Aerospace, Lakeside Office Park No. 18, 607 North Avenue, Dept. P1, Wakefield, Massachusetts 01880.

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This will be the senior position within the group supporting the large departmental computing facility consisting of a number of medium-sized computers and associated equipment in an evolving research environment. The incumbent of this position must be familiar with computer systems, software engineering, and operating systems involved in such a research operation and very experienced and familiar with one of these aspects of such a system. The duties include managing a group consisting of research programmers, research engineers, technicians, operators, and research assistants. Hence, experience and competence in managing personnel, equipment (and its acquisition), and financial affairs are necessary. The person must also be able to interact with a large and diverse research faculty and group of graduate students.

Minimum requirement is a bachelor's degree in computer science, computer engineering, or a related scientific field. Five years of relevant experience in a responsible position is necessary.

The position is academic/professional and in the category of Research Engineer (or Research Programmer, if appropriate). The salary and rank are open, will be competitive, and will be appropriate to the qualifications and experience presented. The position will be available at any time after July 15, 1981. It is hoped to fill the position by September 1, 1981. In order to assure full consideration, application should be received by June 15, 1981. Interested persons should send a complete resume and three letters of reference to James N. Snyder, Head, Department of Computer Science, University of Illinois at Urbana-Champaign, 1304 West Springfield Avenue, Urbana, Illinois 61801, phone: (217) 333-3428.

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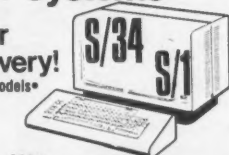
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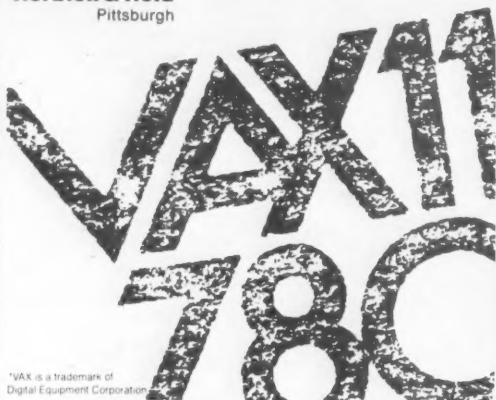
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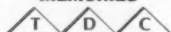
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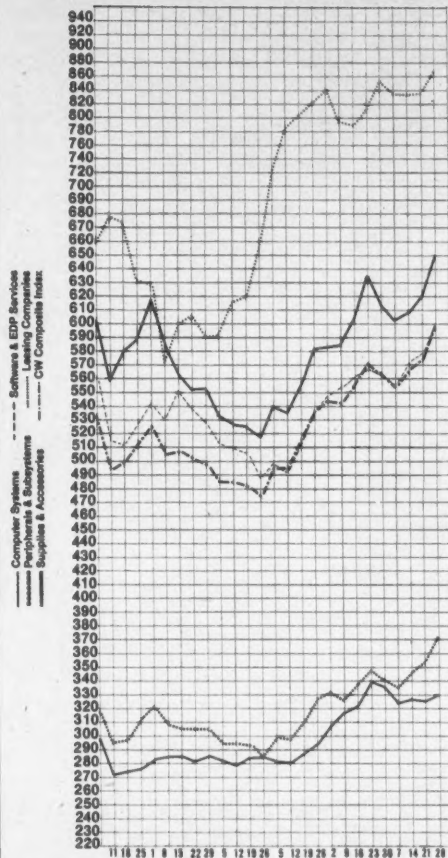


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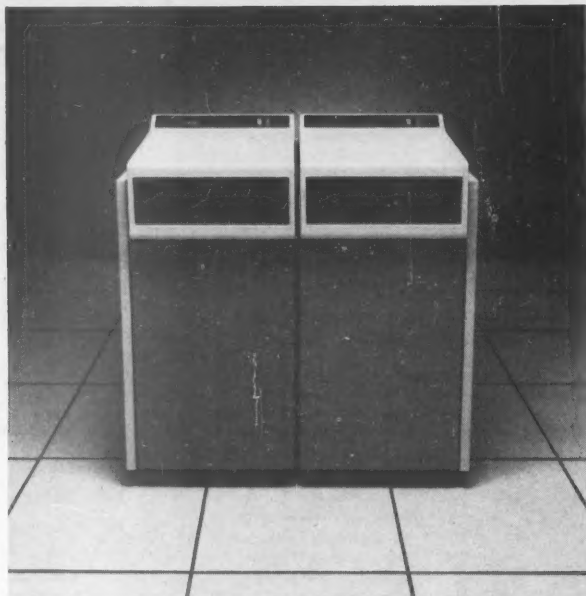
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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 27, 1981

E X C H		PRICE					
		1980-81 RANGE	CLOSE MAY 27 1981	WEEK NET CHNGE	WEEK PCT CHNGE		
COMPUTER SYSTEMS							
A	AMDAHL CORP	15-45	45 1/8	+4 7/8	+12.1		
N	BURROUGHS CORP	42-88	43 3/8	+3/8	+0.8		
O	COMPUTER AUTOMATION	8-27	15 3/4	+1/2	+3.2		
N	CONTROL DATA CORP	35-82	82	+2 5/8	+3.3		
O	CRAY RESEARCH INC	10-48	45 5/8	+1 1/8	+2.5		
N	DATA GENERAL CORP	48-87	87 1/2	+8 1/8	+8.9		
N	DATAPoint CORP	22-85	85	+2 1/4	+3.5		
N	DIGITAL EQUIPMENT	52-112	112 3/8	+10 7/8	+10.7		
A	EECO INC	6-18	17 1/8	+1/4	+1.4		
N	ELECTRONIC ASSOC.	8-12	7 3/8	+1/8	+1.7		
N	FOUR-PHASE SYSTEMS	18-48	44	+5	+12.8		
N	FOXBORO	31-82	52 3/4	+1/2	+0.8		
O	GENERAL AUTOMATION	7-19	14 1/2	-1/4	-1.8		
O	ORI COMPUTER CORP	1-3	1 1/4	-1/4	-18.8		
N	HARRIS CORP	25-60	51 1/4	-1/2	-0.9		
N	HEWLETT-PACKARD CO	48-104	103 3/4	+1 3/4	+1.7		
N	HONEYWELL INC	85-115	85 7/8	+2	+2.1		
N	IBM	90-78	57 7/8	+1 1/2	+2.8		
O	MAGNUSON CORP SYST	20-48	35	+4	+12.8		
N	MANAGEMENT ASSIST	8-25	14 1/8	+1/8	+0.8		
O	MINI-COMPUTER SYST	1-8	3 1/8	+7/8	+38.8		
N	MODULAR COMPUTER SYB	8-31	13 7/8	+1	+7.7		
N	MODNAK DATA SCI	10-31	27 1/2	+3/8	+1.3		
N	NCR	52-82	86 7/8	+1 3/4	+2.8		
N	PRIME COMPUTER INC	10-48	48 5/8	+3 1/4	+7.1		
N	PERKIN-ELMER	13-35	30 1/2	+3/8	+1.2		
N	PERIPHERAL CORP	42-85	50 3/8	+1 3/8	+2.8		
O	TANDEN COMPUTERS INC	13-104	102 3/4	-3/4	-0.7		
N	TEXAS INSTRUMENTS	78-150	118 3/4	+8 3/4	+8.0		
A	WANG LABS.	17-80	42	+4 1/8	+10.8		
LEASING COMPANIES							
O	BOOTHE FINANCIAL CP	13-27	25 1/4	0	0.0		
N	COMDISC INC	8-24	21 5/8	-1/8	-0.3		
A	COMMERCE GROUP CORP	1-2	1	0	0.0		
O	COMPUTER INSTRS GRP	1-4	5/8	0	0.0		
O	CONTINENTAL INFO SYS	2-15	7 1/4	0	0.0		
N	DATRONIC RENTAL	3-5	4 1/8	0	0.0		
N	DCL INC	3-8	3 1/2	+1/4	+7.8		
N	DFI INC	5-12	9	0	0.0		
O	ITEL	1-15	1	0	0.0		
O	LEASAPAC CORP	1-2	3/8	0	0.0		
A	PIONEER TEX CORP	2-4	3 5/8	+3/4	+28.0		
N	RELIANCE GROUP INC	24-84	78	+7/8	+1.1		
N	U.S. LEASING	12-30	27 1/2	+2 1/4	+8.9		
EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-HASH L=LOCAL; M=MIDWEST; O=OVER-THE-COUNTER O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID							

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